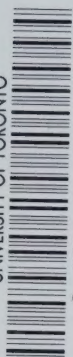


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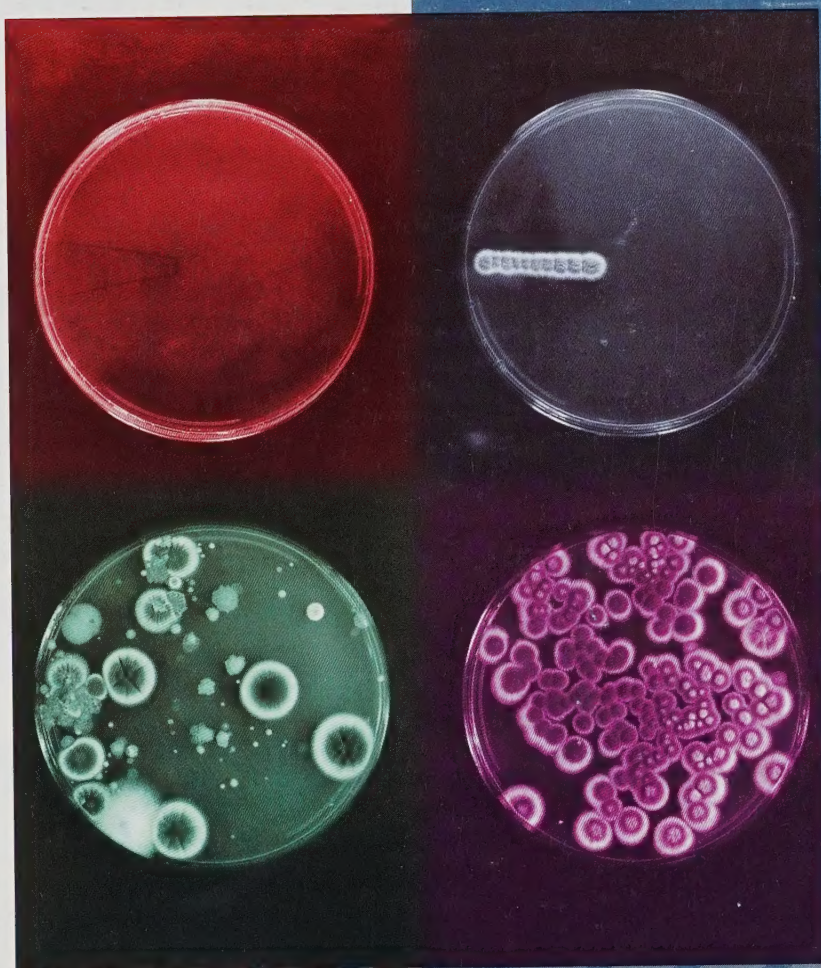


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Journal

Vol. 64, No. 1 • January • 1998



**Elimination Of Microorganisms From Dental
Operatory Compressed Air**

**Lateral Periodontal Cyst: A Case Report and
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**Interobserver Variability In Pediatric Radiographic
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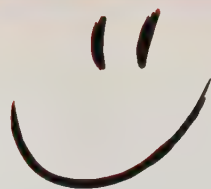
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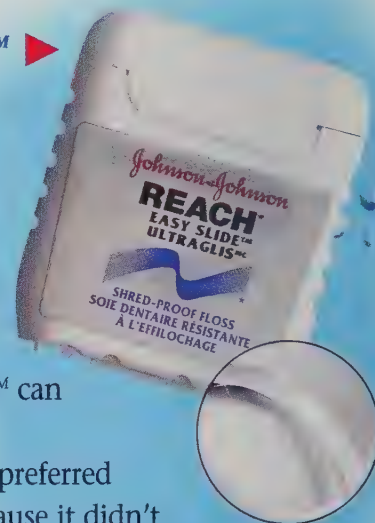
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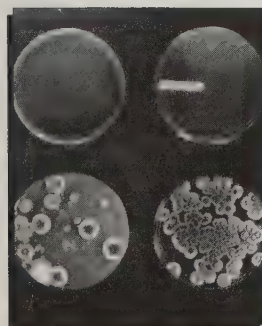


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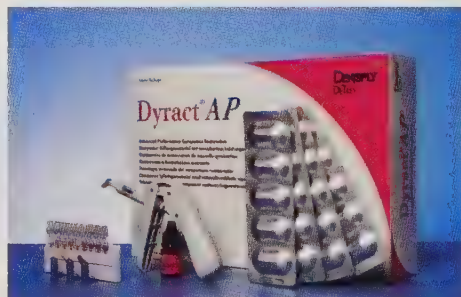
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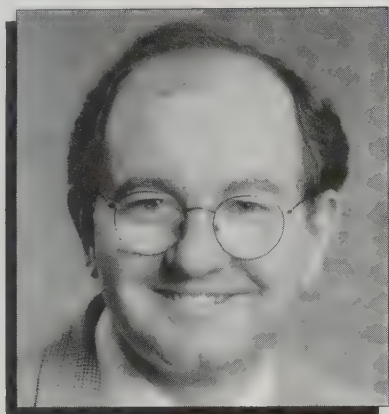
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EDITORIAL

MY VISION FOR THE *JOURNAL*: PLEASE TELL ME WHAT YOU THINK



Dr. John P. O'Keefe

When I started this job, I was advised that CDA's communications and membership (C & M) committee had given me two years to evaluate the current mix of information in the *Journal* and come up with a vision to ensure its continued viability.

I've spent the last four months talking to my colleagues, poring over the results of recent readership surveys and reviewing a discussion paper on the future of CDA publications. The message that I received, loud and clear, is that the status quo is unacceptable.

In November, I presented my preliminary vision for the *Journal* to the C & M committee, which is responsible for overseeing all CDA publications. Now I would like to share it with you, the readers. Please let me know what you think.

I believe that the *Journal* should concentrate on being a top class clinical and scientific publication. In the interest of efficiency, there should be minimal overlap between its contents and those of other CDA publications. Association news and information about the business side of dentistry should appear primarily in *Communiqué*. In my vision, *Communiqué* would focus on meeting member needs, while the *Journal*

would be devoted to promoting optimal oral health for all Canadians. The two publications should have clear mandates and help the association to achieve its goals. If it publishes timely, accurate information that is relevant to practicing dentists, the *Journal* will be effective and valued.

I am not wedded to any particular format for the *Journal*. My goal is to be an effective information broker for Canada's dentists. This may mean changing the number of times you receive the *Journal* in its print form, and how information moves from my desk to yours. Within the next few weeks, the *Journal* will become a combined print-electronic publication. We don't know how electronic publishing will develop in the future, but, we want, with the launch of an electronic version of the *Journal* on the CDA Web site, to be equipped to deliver and receive timely, accurate information electronically. You, the readers, will determine what emphasis we put on electronic publishing over time.

I have started to work closely with CDA's Convention organizers and the manager of the Resource Centre, with the aim of increasing the value we can offer to Canadian dentists. Dentists phone the Resource Centre with queries all the time. By assessing these, we at the *Journal*, and those planning the Convention, can determine what topics are "hot." We can then search for writers and speakers to deal with these issues to your satisfaction.

The *Journal* can also showcase Canadian clinicians who are slated to speak at CDA conventions one or two years from now. I firmly believe that the best education is available close to home. The skeptic in me doubts that high priced gurus can teach me more than my colleagues in a study club, or a well conducted litera-

ture search followed by the retrieval of key articles.

My goal is to bring the reader as far along the path of enquiry as he or she wants to travel. We can cater to the quick reader with clearly delineated abstracts and highlighted sections indicating the clinical relevance of articles, while still allowing the curious reader to read the full text of an article in print or on our Web site. Including the author's e-mail address and phone number at the end of the article would allow the reader to make further enquiries. In addition, our Web site will soon allow the really curious reader to conduct his or her own literature search. I want our information resources to be much more interactive and responsive for members.

The distinct feature of this journal will remain its credibility. My goal is for readers to be confident that the information published by us is as "true" as possible. Our peer review system is designed to ensure credibility and will continue to evolve, but we must ensure that the time from submission of articles to their publication is significantly reduced.

I hope that in the very near future, all editors listed on our masthead, and all reviewers of articles, will be linked with my office electronically. The "virtual" editorial board will be the way of the future. I want to bring general dentists more into the process of writing, editing and reviewing articles. To make this happen, I will be consulting frequently with members of my own local dental society, and with societies and study clubs all around the country. Please send me contact e-mail addresses so that we can get the information flowing. I welcome your feedback about these ideas.

John O'Keefe
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IT'S UNANIMOUS!

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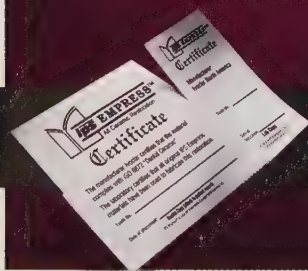
– Gordon J. Christensen, DDS, MSD, Ph.D,
"A Void In U.S. Restorative Dentistry,"
JADA, Vol. 126, (February, 1995), 244-245

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– John W. Farah, DDS, Ph.D,
The Dental Advisor PLUS
Vol. 5, No. 3, (May/June, 1995)

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– Dr. Michael Miller
Reality, Vol. 9, (January, 1995)



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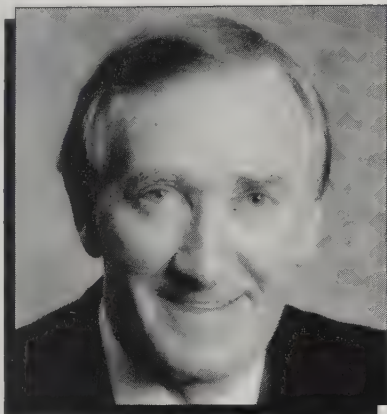
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DENTAL PLANS ARE WORTH SAVING



Dr. Toby Gushue

Since 1994, CDA and our provincial partners have lobbied vigorously to preserve the tax-free status of employer-sponsored health and dental plan premiums.

We proved that dental benefit plans have been instrumental in improving the oral health status of Canadians over the past 25 years, and demonstrated to parliamentarians that a tax on premiums could put the future of the plans — and the oral health of Canadians — at risk.

Survey after survey has shown that Canadians with dental plans visit the dentist more regularly and have better oral health than those with no supplementary coverage. Dentistry has done its part, by promoting the value of oral health, initiating dental awareness programs, and supporting fluoridation. We also made the cost of preventive and diagnostic dentistry more affordable. Our fees for these services have increased at a lower rate than Canada's consumer price index (CPI).

For the past two years, we have lobbied the federal government to extend the tax deduction on health and dental plans to unincorporated, self-employed Canadians. This recommendation was included in the pre-budget report of the House of Commons Stand-

ing Committee on Finance, which was presented to Parliament in early December. If it is adopted by Finance Minister Paul Martin, another significant group of Canadians will be encouraged to seek preventive dental care.

Unfortunately, while the government seems ready to support broader access to tax-free dental care, cost concerns are making some employers have second thoughts. Because dentistry has been so successful in promoting prevention, more patients are using their dental plan, and employers' benefit costs are rising. Many employers are now seeking a way to reduce or control these costs.

Whenever employers and plan administrators talk about rising dental benefit costs, they invariably mention plan abuse. Many clearly believe that abuse is a concern.

The most recent auditor general's report stated that over servicing was a major problem in the Non-Insured Health Benefits (NIHB) program, and that some dentists had been asked to refund payments to Medical Services Branch following audits of their billing practices.

As a profession, we must have zero tolerance for abuse and fraudulent billing. We must support the efforts of plan administrators to identify questionable billing practices, and ensure that the names of possible offenders are forwarded to their respective licensing authorities.

Soft fraud is just as unacceptable as blatant fraud, and may ultimately contribute more to the cost of dental plans. I define soft fraud as legitimate services that are provided primarily to benefit the provider's bottom line. Examples include routinely taking radiographs that have no diagnostic purpose, billing for basic oral hygiene instruction, polishing and scaling teeth that have no plaque or tartar, and replacing serviceable restorations.

Several years ago, when I was the chair of CDA's third party dental plans committee, a dentist called me to complain about a plan administrator's refusal to pay a claim he'd submitted. It seems that the dentist had knowingly billed for a temporary restoration

and an amalgam restoration on the same tooth surfaces.

Another dentist was upset because the administrator would not pay for the five separate restorations (some of which were more than one surface) he'd done on a single anterior tooth.

I wonder if these dentists would have presented the same bills to their patients that they sent to the plan administrators if there were no assignment of claims.

However, I also question the role plan administrators have played in perpetuating abuse. In one case I'm aware of, an administrator replaced the procedure codes for services that weren't covered under the patient's plan with codes for services that were. One administrator actually asked me to do this myself.

The question that comes to mind is this: If an administrator receives a percentage of each dollar paid out by the plan, what incentive is there for that administrator to curb abuse? I know of one administrator who, until recently, never gave clients an explanation of benefits (EOB), even for assigned claims. How could these clients ever know what their dentist billed on their behalf?

Patients also commit fraud, whether it's by asking to have the dates or the name changed on a claim form, or to have procedure codes changed.

Unfortunately, as a society we seem to think that defrauding an insurance company is not stealing. Because we pay our premiums, many of us feel we are entitled to "get something back." Well, we're not, and fraud is a crime any way you look at it.

Dental plans are closely linked to the oral health of Canadians. As professionals, we have a responsibility to ensure the continued vitality of dental plans. We must be ethical and responsible ourselves, and we must educate our patients to use their dental plans responsibly. And, hopefully, our licensing authorities and our courts will deal with the cases of fraud.

*Toby Gushue, BA (Ed.), BA, DDS
President of the Canadian Dental Association*

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LETTERS



CDA Public Awareness Advertising

The October 6, 1997, edition of *Maclean's* newsmagazine contains a full-page advertisement submitted by the Canadian Dental Association. In an attempt to inform the public on how to manage "your dental dollar," the advertisement contains a photograph of a dentist discussing radiographic findings with a patient. The dentist is wearing a white coat with long sleeves, rubber gloves, and has a cup-shaped face mask dangling around her neck.

The photograph illustrates three fundamental errors in dental asepsis:

1. The long-sleeved laboratory coat does not facilitate the necessary and frequent washing of the hands, wrists and forearms.
2. Gloves should NOT be worn during non-intraoral procedures such as shown in the advertisement.
3. Face masks are not meant to decorate the neck.

No doubt the photograph was posed to portray dentistry in a favorable light. However, by failing to understand the basic principles of infection control, the Canadian Dental Association has flawed the image and made a poor use of its limited advertising dollars.

John Hardie, BDS, M.Sc., PhD,
FRCDC

King Fahad Hospital
Riyadh, Saudi Arabia

Independent Dental Hygiene Practice

Let me be the first to say that the Canadian Dental Hygienists'

Association (CDHA) has never influenced my decisions regarding dental hygiene practice. It has always been my intention to establish an independent dental hygiene clinic in order to offer an affordable and reliable alternative to traditional dental hygiene practice.

Dr. Coffin's letter to the editor ("Hygiene's Competitive Challenge To Dentistry," *J Can Dent Assoc* 63:576, 1997) gave interesting insight into some common views held by many dentists. His solution to the challenge of independent dental hygiene practice is to have hygienists question the motives of the CDHA leaders. I, for one, will never question their motives as they have always been in my best interest. He then espouses the development of a course for dental assistants to provide scaling for patients.

In response, I suggest that implementing such a course of action would show a total contempt for the profession of dental hygiene and the public at large. I find this recommendation particularly troublesome coming from a periodontal specialist. Hygienists are true professionals in every sense of the word and have earned the privilege to treat patients in their particular discipline.

A dentist who believes that a hygienist means no more to a patient than a body attached to a scaler should really examine the true role of a hygienist in the current health care environment. Hygienists provide a competent and valuable service to the public, and are simply confined by the current model of oral health care delivery. I, for one, am attempting to provide a true alternative.

Peter J. Magnan, RDH
Vancouver, B.C.

FluoriSHIELD

Dentists may have recently received samples of FluoriSHIELD. Two preparations have been provided in a sample pack: a 0.4 per cent stannous fluoride dental gel,

and a 1.0 per cent sodium fluoride dental gel. These are intended for use in custom mouth guards, allowing direct home application of the material for the remineralization of teeth in xerostomic mouths.

We have tested the acidity of these materials, and note that the 0.4 per cent stannous fluoride dental gel has a pH of 3.4. The 1.0 per cent sodium fluoride dental gel has a pH of 6.5. It has been reported that considerable buffering is required for the stannous fluoride gel to achieve a physiological pH (source: Dr. Gerry Krystal, at the Terry Fox Laboratory in British Columbia). On this basis, we would recommend that only the sodium fluoride be considered for home application in xerostomic patients. We caution that the acid in the stannous fluoride preparation is likely to accelerate demineralization of tooth structure, and is unlikely to achieve the intended protection of tooth structure. Alternative acceptable preparations are already available in the Canadian marketplace.

P. Stevenson-Moore, BDS, MSD,
MRD(C)
British Columbia Cancer Agency
Vancouver, B.C.

French Journal

Dr. Dolman, your wish to publish a French edition of the *Journal of the Canadian Dental Association* is now a concrete reality. Speaking on behalf of the Quebec Dental Surgeons Association (QDSA), I am most pleased to express our thanks for this very positive decision, which is greatly appreciated by Quebec dentists.

Micheline Blain, DDS
President, QDSA
Montreal, Que.

CDSPI and Long-Term Disability Insurance Protection

During recent months, my colleagues have brought my attention to an article and a series of letters that have recently appeared in the

Dalacin® C Capsules (clindamycin hydrochloride)

150 mg, 300 mg

The recent edition of the Sanford Guide to Antimicrobial Therapy 1996 recommends
*Dalacin® C Capsule as

First line antibiotic for empirical therapy of Odontogenic Infections^{1†}



Empirical Antimicrobial Therapy on Clinical Grounds¹

(¹Optimal antimicrobial therapy is based upon accurate indications and susceptible testing of casual agents; these are only "INITIAL" guidelines)

Anatomic site/Diagnosis/ Modifying circumstances	Etiologies (usual)	Suggested Regimens*		Therapeutic Measures and Comments
		Primary*	Alternative**	
Odontogenic Infection	Oral microflora	Clindamycin 300 mg q6h po	Erythromycin 500 mg q6h po or AM/CL*** 500/125 mg bid po	¹ Surgical drainage and removal of necrotic tissue essential. β-lactamase resistant organisms are increased in frequency.**

+ : Dosages suggested are for adults, with clinically severe (often life-threatening) infections. Dosages also assume normal renal function, and not severe hepatic dysfunction.

++ : Alternative therapy includes these considerations: allergy, pharmacology/pharmacodynamics, compliance, local resistance profiles.

+++ : AM/CL = amoxicillin/clavulanate

Adapted from Sanford 1996

*Penicillin, which was the antibiotic of choice for a long time, induces the production of β-lactamase by certain anaerobes, specifically *Bacteroides* species, and clinical failures have been increasingly reported in the literature.²

**In Canada, most *Bacteroides* species are resistant to Penicillin.³

†Dalacin® C capsule is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *Bacteroides* species, *Peptostreptococcus*, anaerobic *Streptococci*, *Clostridium* species and *microaerophilic Streptococci*. Also indicated in serious infections due to sensitive gram-positive organisms (*Staphylococci*, including penicillinase-producing *Staphylococci*, *Streptococci*, and *Pneumococci*) when the patient is intolerant of, or the organism is resistant to other appropriate antibiotics. †Dalacin® C capsule is indicated for prophylaxis against α-hemolytic (*viridan* group) *Streptococci* before dental, oral and upper respiratory tract surgery.

Most commonly reported side effects are diarrhea (2.6%) and vomiting (1.6%). For warnings, please refer to the prescribing information.

• 150 mg capsule: available on all provincial formularies. 300 mg capsules: available on the following provincial formularies -- Ontario, Quebec, British Columbia, Alberta, Saskatchewan, Manitoba, Nova Scotia, Newfoundland.





magazine *Oral Health*. The article and letters are highly critical of the disability insurance field in general, but have also directed venom toward the Canadian Dentists' Insurance Program and its administrator, Canadian Dental Services Plans Inc. (CDSPI). I feel that this is very destructive and of no value whatsoever to the members of our profession.

As a licensed dentist in Canada for over 36 years (23 of them spent assisting in the growth and development of disability insurance for our profession), I feel that perhaps by stating my concerns in your journal we may correct a very false impression that is being created by the magazine *Oral Health*.

As a largely self-employed profession, disability insurance is of vital importance to the overall well-being of our members. We know that the number of insurance companies that are offering disability insurance is decreasing. We also know that the extent of their coverage is being limited. The reason for this is that claims experience has risen to such an extent that in some instances, the amount of money paid out in claims exceeds the amount of money collected in premiums. It does not take a rocket scientist to realize that insurance companies are not in the business of losing money.

Over the next number of years, it will be increasingly difficult to provide extensive disability coverage, not only for our profession but for all professions. That is why the members of our profession have to understand that CDA, through its program administrator CDSPI, is doing its very, very best to see that it can provide adequate insurance for members.

Along with the issue of fewer insurance companies providing disability insurance and the ever-increasing claims experience, there is also the matter of an increase in fraudulent claims. These three factors have made insurers more vigilant of all claims, which

may lengthen the settlement time for claimants.

I recently acquired fairly up-to-date information from CDSPI with regards to the Canadian Dentists' Insurance Program's disability plan. There are currently 186 dentists on claim for disability benefits. In 1996, there were over 300 new and ongoing claims and over \$6.2 million was paid out in benefits. The current reserve to pay these benefits in the future is in excess of \$30 million. It is no wonder that the insurance companies are increasingly vigilant when they are dealing with sums of money of this size.

With regard to Dr. Chantler's recent article in *Oral Health* magazine, let me state that I am the individual referred to in the first article in the reference "my CDSPI representative on the Ontario Dental Association did try to help me. He too was appalled at the behavior of Sun Life with their multiple offers and he said it was a sad state of affairs but they do it all the time."

Now the true fact in that statement is that I, as the Chairman of the ODA Insurance Committee, did successfully respond to the claimant's questions concerning his claim. However, it should be noted that CDSPI does not have an Ontario Dental Association representative. It should also be noted that I absolutely did not say I "...was appalled at the behavior of Sun Life..." nor did I say "it was a sad state of affairs but they do it all the time." What I did do was make a number of phone calls through CDSPI in an effort to expedite Dr.

Chantler's claims settlement. I might add that this was successful and that the function was done as a member of the ODA Insurance Committee, which exists to help ODA members.

Readers should also note that in any year there are hundreds of claims adjudicated and paid under this program. The statistics have shown that less than five per cent of these claims become a problem. I was not able to verify the truth in the original article written by Dr. Chantler nor in any of the subsequent letters sent to the editor of *Oral Health*.

CDA and CDSPI have been aware for years of the increasing difficulty in providing adequate disability insurance for our members. Our membership and our provincial and national organizations must be aware that this is an ongoing struggle that the associations are pursuing on their behalf. We are all aware that disability insurance is a very serious matter. The lives of the members of our profession depend on it for the future should a legitimate disability occur. The goal of maintaining the program will be pursued as diligently as possible on their behalf. Dentists would be wise to look to the dental associations for direction rather than some outside agency that appears to be looking to develop controversy rather than solutions.

R.L. Moran, DDS, FRCD(C)
Past-president, CDSPI, CDA, ODA
Scarborough, Ont.





CDSPI, the Disability Insurance Claim Process, and You

William Leggett, DDS

As the board chair and president of Canadian Dental Service Plans Inc. (CDSPI), I occasionally receive phone calls or letters from colleagues who are concerned about some aspect of their disability insurance claim. This isn't surprising, as claims issues can sometimes be complex.

The concerns raised by my colleagues (the claimants) can usually be resolved to their satisfaction, but not always. We can't please all claimants at all times.

Explaining what CDSPI can do to help you resolve a claim matter is as simple as examining our role in the claim process, i.e. what we are legally entitled to do and what we are prohibited from doing on your behalf.

CDSPI's Role

As the administrator of the Canadian Dentists' Insurance Program, providing you with claims assistance is one of CDSPI's most important duties. Our role is defined in our administration agreement with CDA, as well as in the contracts CDA has with each of the insurers offering coverage under the Canadian Dentists' Insurance Program.

When you begin a claim, CDSPI's obligations to you include explaining the claim process, answering your questions about the process, and assisting you

when you are filling out your claim forms.

Throughout your claim, CDSPI acts as a liaison between you and the insurer. We follow up with you and the insurer regularly to monitor the progress of your claim. If necessary, we also remind you to submit your claim forms on time, and hold the insurer accountable for processing your claim on schedule.

You submit your medical and financial information directly to the insurer. In turn, the insurer reviews this information and decides whether to approve or deny your claim. CDSPI does not have access to the medical and financial information you submit in support of your claim.

Claims Decisions

All claims decisions reached by the insurer must honor the provisions of the Canadian Dentists' Insurance Program's disability insurance plans. If a disability claim is approved, the insurer also determines the amount of benefit payments you receive and their duration. This determination is based on the terms of the insurance contract, your loss of income and your level of disability. Since disability insurance is designed to replace income lost as a result of illness or injury, you won't qualify for disability benefits in instances where your income remains the

same following your disability — despite your medical condition.

Legally, CDSPI cannot intervene in the claims decision-making process. It is always up to the insurer, and never a third-party such as an insurance broker, agent or plan administrator, like CDSPI, to decide whether a claim should be paid. This applies to all claims, including those occurring outside of the Canadian Dentists' Insurance Program.

CDSPI monitors the claim process to confirm that the insurer adheres to the contract provisions when it adjudicates claims. Our goal is to maintain fair, reasonable and timely claim outcomes. Consequently, CDSPI hires independent consultants to conduct claims audits and to make recommendations for improving the process. You'd be hard-pressed to find an insurance agent or broker, anywhere, who takes such an active role with respect to claims.

Nevertheless, the reality is that not all claims will be approved. It is perfectly appropriate for insurers to deny claims that cannot be substantiated. I know that not everyone agrees with this reasoning. From time to time, I've been asked, "Why aren't all claims just paid — no questions asked?" The answer is simple: "Because it costs

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you and all other insurance participants in the long run."

Every claim has an impact on claims experience and contributes to the need for more premium dollars to pay for future claims, so it is in the best interests of all Canadian Dentists' Insurance Program participants for invalid claims to be denied. The denial allows claim reserves to be released. (Claim reserves are the pool of funds insurers draw on to pay present and future claims. The amount of reserves that need to be kept on hand to cover future claim payments is factored into the insurance premiums you pay.)

The money held in the claim reserves belongs to the Canadian Dentists' Insurance Program, not the insurance companies. When the reserves are released, any savings realized are passed back to you and the other plan participants in the form of stable or lower premiums, or in an actual distribution of surplus funds. The insurer does not profit by denying claims.

Claims Disputes

When a claimant is unhappy with the outcome of a claim, the insurer will always review its decision if the claimant provides additional information. In appropriate situations, CDSPI can request a claim review on your behalf. Should a claimant pursue litigation, CDSPI can assist by providing the claimant with copies of the related insurance contracts and his or her insurance file records. However, once lawyers become involved, we usually remove ourselves from the claim review process.

Regardless of the claim situation, CDSPI can not act on a claimant's behalf in a legal proceeding between the claimant and the insurer. If CDSPI "took sides," for instance, by covering a claimant's legal costs during a claim dispute, it would present a conflict of interest for CDSPI. Since our mandate is to protect the interests of all participants in the Canadian Dentists' Insurance Program, we cannot pursue the interests of an individual claimant, and allow ourselves to become involved in litigation that

could potentially have an adverse impact on the program as a whole. By taking sides, we would also violate the contracts held with the insurers and CDA.

Privacy Considerations

Privacy laws prohibit CDSPI from intervening in claims issues that involve your confidential medical information. When you file a disability claim, you will be asked to submit medical information. You and/or your physician will provide this information directly to the insurer. Access to this information is restricted to the individuals at the insurance company who are directly involved in the claims adjudication process. By law, CDSPI cannot access this information.

The same principles apply to the financial information that you and your accountant provide to the insurer. During your claim, we cannot assist you in areas that would involve the disclosure of your confidential medical and financial information. In special circum-

stances, you can sign a release giving CDSPI access to your confidential records, but this is usually not necessary or appropriate.

In dentistry, it's generally accepted that the best time to introduce a patient to the dental office is before a problem develops. The premise is that a relaxed first visit will help prevent patient anxiety during future visits, when problems needing treatment arise. If the same rationale is applied to insurance claims, then knowing in advance what you can and cannot expect from CDSPI in a claim situation should make coping that much easier.

We know that being involved in a claim can be a trying experience, so if you ever have concerns about the claims process, please call us. We will assist you wherever we can. ■

Dr. William Leggett is the chair of the board and president of CDSPI.



Full-time tenure track position at the rank of Assistant Professor available in the Division of Pediatric Dentistry, Department of Community and Pediatric Dentistry effective July 1, 1998. Duties will include the didactic and clinical instruction of undergraduate students at the preclinical and clinical level, research and some administration. A DDS/DMD degree from an ADA/CDA accredited dental school and a certificate in pediatric dentistry from an ADA/CDA accredited training program are required. Candidates should possess appropriate qualifications for licensure and certification as a specialist in Pediatric Dentistry in Saskatchewan. Opportunity for intramural private practice is available. Please submit application complete with curriculum vitae and the names of three referees to: Dr. L.D. Koroluk, Department Head, Community and Pediatric Dentistry, College of Dentistry, University of Saskatchewan, 105 Wiggins Road, Saskatoon, SK, Canada, S7N 5E4.

The University is committed to Employment Equity. Members of Designated Groups (women, aboriginal people, people with disabilities and visible minorities) are encouraged to self-identify on their applications. This position has been cleared for advertising at the two-tier level. Applications are invited from qualified individuals, regardless of their immigration status in Canada.

DENTAL BENEFITS ISSUES



Designing Dental Benefit Plans For Cost Containment Does More Than Save Money

Burton Conrod, DDS

By understanding why cost containment is a feature of most dental benefit plans, and why some methods of cost containment are better than others from an oral health perspective, dentists can go a long way toward ensuring the long-term viability of traditional dental plans.

Dentist-patient communication has already proven to be one of dentistry's most important assets. Our success in educating the public about their oral health and the value of regular preventive dental care has increased the demand for our services, as well as the utilization of dental benefit plans. This, along with fluoridation, has led to significant oral health gains in Canada. More people are keeping their teeth longer, and caries have virtually been eliminated in children in many areas.

Because new techniques and anesthetics have made pain-free dentistry a reality, we've also been able to tear down the "fear" barrier, and increase access to dental care for Canadians. The constant evolution of new treatment services, both conservative and comprehensive, also translates into higher utilization rates for dental benefit plans.

All dentists should be proud of the prevention success story in Canada, and what we did as a profession to make it happen. However, we must be mindful of the fact that our efforts to promote

improved oral health have clearly been assisted by the increased availability of dental benefit plans in the late 1970s and early 1980s.

We must also remember that dental plans are not an entitlement. Primarily provided by employers as a means of helping employees to pay for their oral health care, and supported by the federal government through favorable tax treatment, dental plans are a benefit. Recently, however, some employers have become concerned about the costs of providing dental benefits, and are seeking to bring these costs under control.

The solution being proposed by a number of the plan carriers which design dental plans on the employers' behalf is managed dental care. This alternative has several disadvantages that would ultimately jeopardize the oral health gains we have enjoyed in Canada over the past 30 years.

Building cost containment features into Canada's traditional dental plans is the only way to ensure their survival. Dentistry therefore has a vested interest in supporting the principle of cost containment, but within certain limits.

From dentistry's perspective, while there are many innovative ways to achieve cost containment in dental benefit plans, there are three basic principles that must not be violated. Essentially, the cost containment features of a plan:

- must not jeopardize the delivery of quality oral health care;
- must not infringe on the patient's right to choose their own dentist;
- must not attempt to control treatment planning or interfere with the dentist-patient relationship.

Provided these principles are adhered to, four basic types of cost containment features can be built into traditional dental plans. These features:

- promote prevention;
- inform and involve the patient;
- recognize employer responsibilities;
- provide cost controls.

When the features of dental plans are considered under these headings, it is easy to see why dentists must support and respect the need for cost containment. However, it is also important to remember that coverage limits are ultimately determined by how much the employer wants to pay, and what benefits these dollars will buy.

Promote Prevention

In any discussions with employers, the key message should be that good preventive coverage is the best way to keep employees healthy. Because most dental disease can now be prevented, the most basic dental

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plans should focus on diagnosis and prevention. This type of plan encourages patients to access care. It is then up to the dentist to inform patients about their treatment requirements, and motivate them to accept the needed services regardless of their coverage.

When benefit coverage encourages people to have regular dental examinations, they are made aware of their treatment needs, and can plan future treatment to suit their budget. Preventive services also help to control the advancement of disease.

Unfortunately, the high utilization of scaling and other preventive services is frequently cited as the reason dental benefit costs are rising. Perhaps we need a fresh approach, with a sliding scale of co-payments rather than rigid frequency limitations. For instance, the first two units of scaling could be covered at 80 per cent, with the patient paying 20 per cent. The next two units could be covered at 50 per cent, and further units at 25 per cent.

This approach would encourage patients to accept needed treatment, by helping them to pay the associated costs. It would also encourage patients to improve their home care procedures, so that they would require fewer units of scaling in future.

Inform and Involve the Patient

No other cost containment feature has as much value for dentists or their patients. The way to ensure that patients are informed and involved in their dental treatment decisions is to make their dental plan non-assignable. Having the patient pay the dentist directly encourages dialogue between the patient and dentist, and discourages the entitlement mentality that can cause people to underestimate the value of dental treatment. Co-payment systems can also encourage the patient to become a partner in his or her oral health.

Patients who pay all or part of their treatment costs out of their own pocket will be more likely to follow our home care recommendations. Dental plans that provide 100 per cent coverage do not motivate patients to take responsibility for their oral health. Getting

patients to accept this responsibility is necessary for any health benefit plan to function well.

In addition, dental plan design must allow the carrier to educate employees on the wise use of their benefits, and make it clear that a dental plan is not a treatment plan. To this end, frequency limitations on specific services could be replaced by a dollar limit on types of treatment. Rather than limit specific preventive procedures, an annual dollar limit could be placed on all preventive services. The patient, in consultation with the dentist, would decide which services are appropriate.

This approach could wipe out the notion that uncovered services are unnecessary, and encourage patients to accept needed treatment. The limitation is clearly only a cost containment factor, and would not influence the patient's treatment decision.

No dental plan covers the entire range of treatment patients may require at any given time. Patients must be informed that abusing their dental plan could ultimately lead to its demise. They need to understand why they should not attempt to access benefits that they are ineligible to receive, and also to recognize and report any abuse of their plan by a dental office.

Employer Responsibilities

Dental plan design should also recognize the employers' responsibilities, which include making the employees aware that their plan exists solely to help them pay for dental treatment. Employers must discuss the importance of cost containment with their employees. In addition, they should not offer employees a flex plan unless it includes a core basic dental plan. Without this component, employees would likely opt in and out of dental flex plans depending on their immediate dental care needs. This would ultimately increase the cost of their dental care, as it would add on the cost of treatment necessitated by neglect.

Employers should also insist on dental plan designs that allow claims processors to be audited. This will ensure that cost containment features in the plan are being used and monitored correctly. For

example, when co-payment schedules are in place, the patient must pay their share of whatever fee the dentist charges.

Cost Controls

Cost controls are basic cost containment features, such as deductibles and annual maximums. Deductibles involve the patient in their dental plan and help to promote the value of dentistry, while annual maximums help to prevent unexpected annual plan expenditures.

Monitoring is another useful form of cost control. It allows questionable treatment practices to be documented and referred to the appropriate dental licensing authority for action. Quality assurance in dentistry is clearly a function of the provincial licensing authorities. The efforts of some plan carriers to devise elaborate quality assurance programs will add unnecessary administrative costs to dental plans. Regardless of any financial repayment arrangements between a dentist and an insurance company, cases of plan abuse by dentists must be referred to their licensing authorities.

In summary, cost containment provisions in dental benefit plans can:

- help to ensure the future existence of plans;
- encourage patients to be partners in their oral health;
- enhance patients' perception of the value of dentistry;
- encourage patients to take responsibility for their own health.

Cost containment can be achieved in a cost-effective, fee-for-service dental plan that allows patients the freedom to visit the dentist of their choice. But it requires dentists, patients, employers, and the dental benefits industry to work together. CDA is committed to working with the other stakeholders to achieve this goal. ■

Dr. Burton Conrod is the chair of CDA's joint steering committee on dental benefits issues, a CDA governor, and a member of CDA's executive council. He is in private practice in Sydney, Nova Scotia.



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SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1997-1998 quiz will appear in the June 1998 issue of the *Journal*. Answers to the quiz will be published in the July-August 1998 issue. Dentists who complete the quiz may be eligible to receive continuing education points. The names and license numbers of all dentists who complete the quiz will be forwarded to their respective provincial licensing bodies for consideration. Quiz results will not be provided to individual dentists, and will only be forwarded to those provincial licensing bodies which specifically require them to assess the eligibility of participating dentists to receive continuing education points.

Questions 16 through 20 are a repeat of the questions that appeared in the December issue of the *Journal* accompanied with correct answers, the rationales and specific references. Questions 21 through 25 are new questions. The correct answers, rationales and specific references will be provided in the February 1998 issue. Keep all copies of the *Journal* so you can correctly respond to the June 1998 quiz.

QUESTION 16

Both amalgam and composite resin can be used as a retrograde root filling material. Which of the following statements are correct?

1. Amalgam requires an undercut for retention; composite resin does not.
 2. Amalgam seals accessory canals more effectively than composite resin.
 3. Amalgam and composite resin show the same postoperative healing properties.
 4. Both amalgam and composite resin are cytotoxic.
- A. (1) and (2)
B. (2) and (3)
C. (1) and (4)
D. (1) (2) (4)

ANSWER: C

RATIONALE:

A recent study^{1,2} of 388 retrograde root fillings with amalgam and composite resin (Retroplast) showed that healing postoperatively was much more favourable when composite resin was used to obliterate the root end. The Retroplast composite was bonded to the root end with Gluma to a slightly concave non-retentive surface. Gluma is a water based solution of 5.0 per cent glutaraldehyde and 35 per cent 2-hydroxyethylmethacrylate (HEMA). It acts on the dentinal collagen and allows the methacrylate groups to bond. When applied to the root end, care must be taken to coat only the root end dentin, before applying the thin layer of Retroplast. A dry field is necessary. For amalgam, an undercut cavity is required for retention.

Retroplast seals the main root canal and accessory canals as well as the dentinal tubules. Healing results after

one year were significantly better with Retroplast as compared to amalgam. Both materials are cytotoxic but the mercury content of amalgam makes it less acceptable from a toxicological point of view. Histological studies of the two materials show that it is more difficult to secure a hermetic bacterial seal with amalgam.

A radiographic follow-up study³ by the same authors has demonstrated a 99 per cent success rate in the healing of the surgical areas after eight to nine years when treated with a dentin-bonded composite resin.

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- 1) Rud, J., Munksgaard, E.C., Andreasen, J.O. et al. Retrograde root filling with composite and dentin-bonding agent. 1. *Endod Dent Traumatol* 7:118-125, 1991.
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QUESTION 17

Chlorzoin is

1. an antimicrobial agent;
2. used to treat chronic gingivitis;
3. effective in reduction of dental caries;
4. painted on the tooth enamel;
5. a drug which releases chlorhexidine.

- A. (1) and (2)
B. (1) (2) (3)
C. (1) (3) (4) (5)
D. All of the above.

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ANSWER: C

RATIONALE:

A relationship between dental caries and *Streptococcus mutans* has long been established. Over the past 25 years caries has been managed by controlling the growth and colonization of *S. mutans* on tooth surfaces. Chlorhexidine has proven to be an effective antimicrobial agent in this regard.

A recent review¹ provides excellent data on the use of chlorhexidine for caries management. Chlorhexidine varnishes have been shown to reduce effectively the numbers of *S. mutans* in the oral cavity for long periods of time. These varnishes, of which Chlorzoin is one, are usually applied once to the tooth surfaces and repeated only when *S. mutans* recolonize or remain at a high level as detected by saliva sample monitoring.

Chlorzoin is an antimicrobial agent which contains 10 per cent chlorhexidine acetate as the active ingredient. In application, the teeth are first cleaned with pumice or a non-oil based prophylactic paste. After thorough drying, the liquid containing chlorhexidine is applied to all tooth surfaces. When it is dry, a coat of polyurethane in acetone is applied and air dried. For approximately eight hours thereafter, chlorhexidine is released and during that time colonization of the teeth by *S. mutans* is reduced. Although it is known that there is an effective reduction in the numbers of *S. mutans* for months after application, little knowledge exists regarding the effect of chlorhexidine varnish treatment on actual caries, although one study reports a reduction in root surface caries² and another³ reduction in fissure caries.

Although chlorhexidine mouthwashes have been shown to be effective in management of gingivitis, Chlorzoin is not advocated for control of chronic gingivitis. Indeed contact with the gingivae during application of the varnish should be avoided as it may cause inflammation, redness and/or a tingling sensation, with discomfort.

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- 3) Bratthall, D., Serinirach, R., Rapisuwon, S. et al. A study into the prevention of fissure caries using an antimicrobial varnish. *Int Dent J* 45:245-254, 1995.
- 4) Sandham, H.J., Brown, J., Chan, K.H. et al. Clinical trial in adults of an antimicrobial varnish for reducing Mutans Streptococci. *J Dent Res* 70:1401-1408, 1991.

QUESTION 18

Resin-modified glass ionomer cements are recommended for use clinically

1. to restore Class V abrasion lesions;
2. as luting cements for crowns;
3. as bases for amalgams and composite resins;
4. because of biocompatibility;

5. as primary tooth restorations.

- A. (1) (2) (3)
- B. (1) (3) (4)
- C. (1) (3) (4) (5)
- D. All of the above.

ANSWER: D

RATIONALE:

The resin-modified glass ionomer cements (RMGIC) have properties which make them ideal in many clinical situations. Because of easy placement and improved esthetics they are preferred to the conventional glass-ionomer materials. However, they are not as esthetic as resin composites because of the inherent opacity of the set glass ionomer material. The RMGIC materials incorporate a light curing system to obtain initial set in addition to the traditional acid base reaction between the acid soluble glass powder and polyalkenoic acid.³

Since they release fluoride, the RMGICs are an attractive option over composite resins for Class III and Class V restorations which are non-load bearing. They are also recommended as restorations in the primary dentition.

Besides being acceptable biologically, these modified resins have a biotherapeutic effect since with the initial set there is a burst of fluoride release which passes directly into the adjacent tooth structure causing conversion of hydroxyapatite into more insoluble hydroxyfluorapatite. This property and the ability to adhere both to dentin and enamel make them ideal bases for amalgam and composite resin restorations and also as luting cements for crowns where an acceptable film thickness is provided.

Because of the biotherapeutic property, these cements can also be used as alternatives to fissure sealants. A recent study⁴ compares both materials clinically. After one year, although retention of the RMGICs was less than sealants, there were fewer marginal discrepancies. Between both materials no difference either in caries development or marginal discoloration was detected.

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QUESTION 19

You have prescribed metronidazole 500 mg p.o. for a patient with an acute periodontal infection. The patient is a 20-year-old woman who is on the "pill." You would tell the patient

1. to take the medication two times daily;
2. to take the medication three times daily;
3. that the "pill" may not be effective;

4. not to drink alcohol;
5. that the urine might turn dark.

- A. (1) and (3)
- B. (2) and (3)
- C. (1) (3) (4)
- D. (2) (3) (4)
- E. (2) (3) (4) (5)

ANSWER: E

RATIONALE:

In order to maintain adequate blood and tissue levels, metronidazole should be prescribed every eight hours. Although the incidence is low, metronidazole can interfere with the recirculation of some oral contraceptives through the enterohepatic circulation. In such cases, conception may not be prevented. Patients on metronidazole should not drink alcohol because of a possible disulfiram-like reaction. Disulfiram (antabuse — used sometimes in the management of alcoholism) causes violent retching and vomiting in combination with alcohol. It is possible for metronidazole to cause a similar reaction. Darkening of the urine can occur probably due to a metabolite of metronidazole and seems to have no clinical significance. Because metronidazole is mutagenic in vitro, it should not be prescribed for patients who are pregnant.

REFERENCES:

- 1) Compendium of pharmaceuticals and specialties. 31st ed. 1996.
- 2) Sandor, K.B. and Uffen, K.F. Oral contraceptive failure. *J Can Dent Assoc* 10:775-777, 1987.

QUESTION 20

In Class II restorations where the margins involve dentin on the root surface, composite resin restorations are often at risk because

1. bonding to dentin is poor;
2. moisture control is more difficult;
3. excessive accumulation of bonding agent can occur;
4. curing and finishing is more difficult.

- A. (1) and (2)
- B. (1) (2) (3)
- C. (2) (3) (4)
- D. All of the above.

ANSWER: D

RATIONALE:

Where margins involve enamel only, composite resin restorations are most resistant to staining, microleakage and secondary caries. When the margin, however, involves root dentin, chances of adequate bonding are reduced since moisture control, placing of the bonding agent and curing and finishing are much more difficult. Even the best clinical management may not eliminate moisture contamination in the proximal box area during bonding. A further problem is a "pooling" of primer or bonding agent at the base of the box, especially if these agents are applied after

the matrix is in place. Polymerisation shrinkage is also a problem, particularly in a Class II composite with deep subgingival margins. This problem is magnified when using light-cured composites. In such extended cavities the composite should be cured in small increments.

Leinfelder² points to the fact that posterior composite resin restorations are much more technique sensitive than amalgam and that most important for success in the composite restoration is the depth of the gingival floor and the centric holding area. The deeper the gingival floor the less the potential for success. Additionally, the greater the cuspal contact on the composite from the opposing tooth the greater the chances of excess wear, fracture and microleakage. Rubber dam placement and moisture control become the sine qua non. Where this cannot be achieved, another restoration should be planned.

REFERENCES:

- 1) Bayne, S.C., Heymann, H.O. and Swift, E.J. Update on dental composite restorations. *JADA* 125:687-701, 1994.
- 2) Leinfelder, K.F. After amalgam, what? Other materials fall short. *JADA* 125:586-589, 1994.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 21

The incidence of dry socket following mandibular third molar extractions can be reduced by preoperative use of a chlorhexidine gluconate mouth rinse and pre-extraction control of pericoronitis.

Fibrinolytic alveolitis most frequently occurs in the maxillary posterior sextants.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

QUESTION 22

The youthful face when compared with the face of the elderly shows

1. less tissue fat;
2. skin ptosis;
3. a full vermilion border to the lips;
4. prominent naso-labial folds.

- A. (1) and (2)
- B. (1) and (3)
- C. (3) and (4)
- D. All of the above.

QUESTION 23

A patient presents in your office complaining of a very painful mouth. Examination reveals multiple soft tissue ulcers surrounded by erythematous mucosa. She states that she is receiving injections to treat a cancerous lesion in her abdomen. Your tentative diagnosis of the mucosal lesions is

- A. aphthous ulceroserosive;
- B. lichen planus;
- C. ulcers related to chemotherapy;
- D. erythema multiforme;
- E. metastatic lesions.

QUESTION 24

In the periodontal screening and recording method (PSR), code 2 indicates that

- 1. the coloured area of the probe is visible;
 - 2. no bleeding is present;
 - 3. no subgingival calculus is detected;
 - 4. subgingival calculus is detected;
 - 5. bleeding is present.
- A. (1) and (2)
 - B. (1) and (3)
 - C. (1) (2) (3)
 - D. (1) (4) (5)

QUESTION 25

For cardiopulmonary resuscitation (CPR) of adults, the American Heart Association guidelines recommend that the

- 1. rate of chest compression be 80 to 100 per minute;
 - 2. rate of chest compression be 40 to 60 per minute;
 - 3. point of chest compression be over the lower one third of the sternum;
 - 4. point of chest compression be over the xiphoid process;
 - 5. chest depression be 4.0 to 5.0 cm.
- A. (1) and (4)
 - B. (2) and (4)
 - C. (1) (3) (5)

D. (2) (3) (5)

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Colgate, the Fowler-Pearce Partnership (Scotia-McLeod), Nobel Biocare, and SciCan.

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CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education points required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education points.

Funding for the SLSA program has been provided by:

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BOOK REVIEWS

Anesthesia Drug Manual

by P.F. White

1996, W.B. Saunders Co.,
Philadelphia, Pa.; 378 pages;
\$35.00 (US)
ISBN: 0-7216-6221-8

This soft-cover book attempts to help clinicians keep pace with the incredible influx of drugs entering the market. Not only does it deal with anesthetic drugs, but it also includes adjuvant medications that have become necessary to treat disease and complex medical problems and which may interact with drugs used in the delivery of anesthesia.

The last thing a practitioner of anesthesia needs is another huge text. This manual is particularly attractive because it is a very up-to-date drug compendium that can be easily carried in one's pocket and used for quick reference. The primary author is assisted by 39 contributors and their stated intention is to update this book on a biennial basis.

The book is divided into 34 chapters that are grouped according to the pharmacological classification system used in the United States Pharmacopoeia (USP). It covers topics from adrenegics to vitamins and almost everything in between. Within each drug group, the individual drugs are listed alphabetically, according to their generic name. The properties of each drug are further listed as trade name(s), indications, pharmacokinetics, pharmacodynamics (including all body systems), dosages, contraindications and drug interactions. In the pharmacodynamic section, I wish there was a brief statement as to the actual prime mechanism of action. While this information can usually be found with respect to the effects on various body systems, it is occasionally left out.

Some of the material may be confusing for readers. For example, one of the stated indications for testosterone is breast cancer, but the text also states that it is one

of the contraindications. An in-depth knowledge of pharmacology would clarify this apparent contradiction, however, and it is hardly a fault in this excellent text. Similarly, the text states that an allergy to para-aminobenzoic acid (PABA) is a contraindication to bupivacaine, but bupivacaine is an amide and, unlike esters, is not structurally related to PABA.

The text contains a glossary of terms and an index. The contents are not referenced directly in the body of the work, nor is there a bibliography.

Any practitioner will appreciate the usefulness and "reader-friendly" format of the *Anesthesia Drug Manual*. I only wish I had several copies to keep in strategic places.

Reviewed by:

Earle R. Young, B.Sc., DDS, B.Sc.D.,
M.Sc., FADSA,
Toronto, Ont.

Evidence-Based Medicine: How To Practice and Teach EBM

by David L. Sackett, W. Scott
Richardson, William Rosenberg,
and R. Brian Haynes

1997, Churchill Livingstone, New
York; 250 pages; \$36.00 (Cdn)
ISBN: 0-443-05686-2

This succinct, practical and important book by an Oxford/McMaster/Rochester, N.Y., group could be considered a manifesto for the future of clinical education and practice. Evidence-based medicine (EBM) "de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision-making, and stresses the examination of evidence from clinical research." The book is written for busy clinicians at any stage of their career who want to learn and teach evidence-based medicine.

The authors, often in vivid and sententious terms, challenge the traditional sources of knowledge in medicine, particularly the clinical

textbook which they regard as a dinosaur destined for the ice age. They also refer to conventional continuing medical education only to highlight its uselessness. Sackett and colleagues try to reassure us that EBM complements and does not dispense with the need for clinical expertise and judgment and that this discipline does not lend itself to being a sharpening tool for the bureaucratic axe. The former point seems undeniable but until more convincing arguments are forthcoming, some skepticism must remain on the latter.

The authors recommend that in the electronic age, the way to provide best care for patients is by clinical decision-making based on up-to-date appropriate evidence retrieved by personal computers. Electronic searching of medical literature databases demands skills that should not be particularly difficult to acquire, even for mature members of the health professions. Those who rely on the Internet will find it too diffuse for adequate literature searching. Even the popular and extensive Medline resource can be inconsistent and indefinite in retrieving comprehensive and acceptable evidence, unless the clever search strategies described in this text are used to get the best results. It would appear that the ultimate route is through specialized, high-quality, evidence-based secondary publications acting as time-saving sieves of key articles in primary journals. These publications set rigorous criteria for inclusion of articles. They are few in number, as yet, and those in existence refer mainly to a select group of clinical specialties. But it seems inevitable that appropriate dental publications will soon emerge.

To appraise evidence for validity and clinical importance, it is also essential to know the principles of clinical epidemiology and to be competent in their application. Replicated randomized controlled trials are regarded as the gold

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standard of evidence, although these authors also put faith in the still controversial meta-analysis, a relatively recent method of systematically reviewing the literature. However, in many cases, ethical and research design constraints result in lower, non-experimental, levels of evidence.

The evidence-based approach described in this well-written book leads the reader through many clinical scenarios for appraisal of diagnostic tests, prognosis, treatment, harm (avoidance) and guidelines to provide the best possible care for patients. These skills and self-evaluation will enable the clinician to apply beneficial clinical manoeuvres and distinguish them from those that are useless or even harmful to patients.

Undoubtedly, some readers will be reluctant to accept the concepts promoted in this book, but, like it or not, we have entered the evidence-based era in the health care disciplines. Clinicians should no longer be satisfied with professorial and other authoritative opinions unless they are given credibility by acceptable levels of evidence. There is plenty here to teach the teachers.

Over recent decades, the notion that dental education is at the crossroads has been reiterated to the point of being a cliché, and to date it would appear that we have followed Yogi Berra's advice, "When you come to a fork in the road, take it!" Now the signpost is clear; we have evidence-based medicine to show us the way.

Reviewed by:

David W. Johnston, BDS, MPH
London, Ont.

Differential Diagnosis Of Oral and Maxillofacial Lesions, 5th Edition

by Norman K. Wood and Paul W. Goaz

1997, Mosby-Year Book, Inc., St Louis; 656 pages, B&W illustrations and 120 color plates; \$72.95 (US)
ISBN: 0-8151-9432-3

The updated 5th edition is a clinically oriented reference text that could be used by all health

care workers dealing with oral and maxillofacial lesions, but would be most useful to dentists and dental students. The authors omit in-depth information on pathophysiology and pathogenesis, and concentrate instead on clinical features, radiographic interpretation and recommended management of oral conditions. The book is well written, easy to read, and well illustrated, with occasional exceptions such as the confusing suggestion that odontogenic keratocyst is a type of dentigerous cyst (p. 283) and the repetition of illustrations in figures 11- 11D and 11- 11E (p. 172).

The text is divided into two main sections. One section deals with the identification and differential diagnosis of oral soft tissue lesions, which are grouped by common clinical features such as white lesions, pigmented lesions and exophytic lesions. The second section deals with radiographic interpretation of jaw lesions grouped by common parameters such as radiopacity and radiolucency. Additional smaller sections deal with lesions grouped by site (e.g. neck lesions, skin lesions) and other selected topics (e.g. oral cancer, AIDS, viral hepatitis). By necessity, there is some repetition from section to section since most oral lesions exhibit more than one identifiable feature. This problem is minimized as much as possible by internal references or synopses of repeated conditions.

The book's minor flaws include the use of outdated terms (e.g. "granular cell myoblastoma" (p. 20), "intercellular substance" (p. 82)); occasional minor errors (e.g. figure 3-5B (p. 20) is identified as an adenoid cystic carcinoma, but appears to be a polymorphous low grade adenocarcinoma, and Civatte bodies in lichen planus are said to be immunoglobulin and fibrin globules (p. 76)); and occasional speculation (e.g. interdental papillitis is identified as an atypical form or recurrent oral herpes simplex, based on an author's unsupported observations (p. 168)).

In conclusion, the book is an excellent reference text for the

quick identification and differential diagnosis of oral and maxillofacial lesions, based on their clinical and radiographic features. Recommended management is included, but is not comprehensive. The text offers the head and neck health care worker with an excellent practical guide for use in day to day professional practice.

Reviewed by:

Tom Daley, DDS, M.Sc., FRCDC
London, Ont.

Parodontologie du diagnostic à la pratique

by Pierre Bercy and Henri Tenenbaum

1996, De Boeck Université, Brussels, Belgium; 290 pages, color photographs; \$100.00 (Cdn)
ISBN: 2-8041-2286-7

This review will be approached from three angles: presentation, format and usefulness.

The presentation of this book is definitely praiseworthy; the chapters are written in a refined language and each one ends with a clearly identified and very concise summary. The photographs are extremely sharp, and all are in color.

The chapters follow a precise format: the book begins by addressing the elements involved in diagnosing periodontal diseases, followed by chapters concerning surgical and nonsurgical treatments, including the most interesting chapters on pharmacotherapy and periodontal bacteriology. The book concludes by covering postoperative and long-term follow-ups.

As for the usefulness of this work, the descriptions of certain surgical procedures are too brief, and therefore a clinician could not apply them without first taking a complementary practical course. On the other hand, if the desired effect is to provide excellent quality information or to motivate future periodontal practice, then this book would well serve all practitioners.

Reviewed by:

Guy Rostenne, DMD
Montreal, Que.

the CDA RSP your high performance vehicle



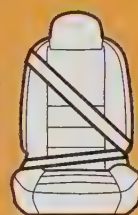
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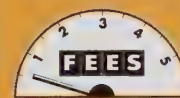
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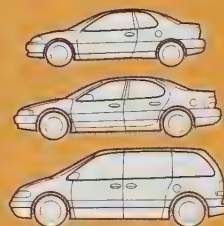
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The Performance RRSP



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CANADIAN DENTISTS'
INVESTMENT PROGRAM

NEWS UPDATE

CDA To Provide Expertise, Statistical Data To AFN

CDA will provide expert advice and statistical data on the utilization of dental services to the Assembly of First Nations (AFN) this year, before the federal government moves ahead with its plans to transfer the administration of the Non-Insured Health Benefits (NIHB) program to Native communities.

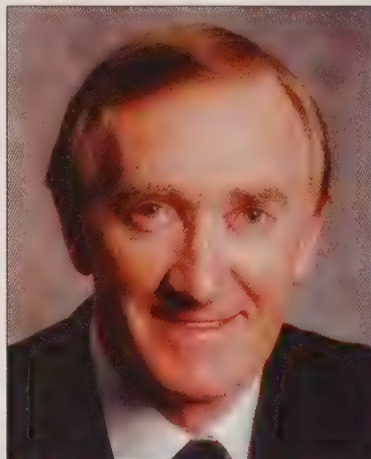
"Native leaders are concerned about the transfer process, and whether the new program structure being proposed by Medical Services Branch will meet the oral health needs of their people," said CDA president Dr. Toby Gushue. "Although they have been able to provide Health Minister Allan Rock with anecdotal evidence to support their concerns, they don't have hard data to back them up. Our goal is to help Native people gain access to the same kind of quality dental care that other Canadians take for granted."

CDA met with AFN in December to renew its relationship with the organization, and discuss mutual concerns regarding the NIHB program with the assembly's new national chief, Mr. Phil Fontaine. Much of the meeting was devoted to discussing the transfer process, and what CDA and AFN can do to keep it from having a negative impact on the oral health of Native Canadians.

AFN is seeking information on the low utilization of dental services by Native Canadians, as well as statistics demonstrating the generally poor oral health status of this group relative to the Canadian population in general. In addition, CDA will compile data on the high numbers of restorations and tooth extractions among the Native population.

Based on current estimates, only 40 per cent of Native Canadians make use of the dental care services available to them through the NIHB program. Increasing access to dental care for the Native population, as well as their dental awareness, could improve the situation, but would likely lead

to funding shortfalls. The utilization rate for non-Native Canadians, most of whom are covered by either private or public supplementary dental plans, is approximately 70 per cent.



CDA president Dr. Toby Gushue

"The bottom line is that AFN wants its people to have access to quality dental care," said Dr. Gushue. "They are thankful that we have agreed to act as a resource and expert counsel on their behalf, and we are glad to be of service. Part of CDA's mission is to promote optimal oral health for all Canadians, and this certainly falls into that category."

The federal government initiated the transfer process several years ago, primarily to reduce the costs of providing health and dental care to Canada's Native population. Some Native bands are already administering their own dental programs. ■

RIC Meets, Makes Progress On Pension Reform

The Department of Finance has asked CDA and its partners in the Retirement Income Coalition (RIC) to come up with a better way of educating Canadians about their retirement savings options.

RIC met with senior officials from the department in December to discuss various aspects of Canada's current pension system, and whether it can provide Canadians with a satisfactory standard of living in their retirement years.

During the meeting, the department and RIC agreed to move ahead in three specific areas: developing a new approach to educate and inform Canadians about effective retirement strategies; integrating RIC's platform into a formal House of Commons committee that will examine the retirement income issue; and considering what to do with a new RIC retirement savings model that uses econometric analysis to measure the amount of money that average Canadians could put aside for retirement.

It is unlikely that the Commons committee will be formed before Finance Minister Paul Martin delivers his 1998-99 budget this spring, however, and it may not be in place until some time in 1999.

RIC will likely meet with Department of Finance officials early this year to discuss new communications and education strategies, and to suggest appropriate uses for its retirement savings model. ■

CDA Calls For Tough Action On Tobacco

In a strongly-worded letter, CDA has called on Health Minister Allan Rock to reconsider his plans to amend Canada's new Tobacco Act to allow tobacco companies to sponsor car racing.

"This move could have a domino effect leading to demands from other sports and arts groups for equal treatment. There is a real risk that the restrictions on sponsorship now in the Tobacco Act will collapse," wrote CDA president Dr. Toby Gushue.

"A policy paper prepared by your department has determined that tobacco advertising for sponsored events, like auto racing, is more effective than overt product advertising. The use of celebrity role models implicitly endorses tobacco products and encourages kids to smoke. Health Canada research shows that 83 per cent of 10 to 19-year-olds think sponsorship ads advertise cigarettes. Only 56 per cent think they advertise sports and cultural events. This proposed amendment hands the tobacco

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Data from Wear Rates of Various Types of Prosthetic Denture Teeth, J.F. Farmer, M. Marshahid, K.E. Leinfelder (University of Alabama School of Dentistry), J Dent Res 72, 1993, #426



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industry one of the most effective advertising vehicles to reach children, and is contrary to the government's much applauded focus on children's health and welfare."

CDA supports strong legislation to control the use of tobacco products in Canada, including an outright ban on advertising and promotion. The association views Canada's new Tobacco Act as a key first step toward eliminating the use of tobacco products and creating a healthy, smoke-free society.

"The restrictions in the Tobacco Act are vital health measures and an important element of a comprehensive strategy to reduce tobacco use in Canada, particularly among its teenagers. The use of tobacco products is the leading cause of preventable death and disease in Canada, accounting for some 30,000 deaths annually," wrote Dr. Gushue.

CDA has offered to support the government in future initiatives to help Canadians stop smoking, and was a partner in Health Canada's recent Quit-4-Life program. Quit-4-Life provided interested teenagers with information and tools to assist them in quitting the tobacco habit. ■

CDA Supports Publication Of Non-Smoking Booklet

A booklet that slams Health Minister Allan Rock for proposing to eliminate a ban on tobacco-company sponsorship of international auto racing has been endorsed by CDA and other concerned health care organizations.

Published by the Non-Smokers' Rights Association (NSRA) under the title *Action Alert*, the booklet asks: "Who will set health policy for Canadians? Health Minister Allan Rock? or the organizers of the Montreal Grand Prix?"

The four-page booklet, which was distributed in November, uses the findings of an internal Health Canada report to demonstrate how tobacco-company sponsorship of auto racing can encourage smoking among young people. It also reviews the actions taken by other countries to ban this form of advertising, and explains what's at risk if Canada fails to follow suit.



Dr. Kevin Roach (l) presented Dr. Doug Smith (c) and Dr. Ralph Crawford (r) with a cheque for \$1,000 from the Pierre Fauchard Academy in September. The money will used for the Dentistry Canada Museum.

"An exemption would ... create a slippery slope of demands for exemptions sufficient to destroy the intent of the law..." states the booklet. "A stampede of arts and sports groups will come forward with demands for equal treatment. They may also seek partners in other countries to demand an international exemption. There is a real risk that the restrictions on sponsorship advertising now in the Tobacco Act will collapse..."

"Health agencies, health units, health professionals and individuals concerned about the tobacco industry's recruitment of children can all help to block the government's cave-in to auto racing."

The booklet was endorsed by CDA, the Canadian Cancer Society, Canadian Council For Tobacco Control, Canadian Lung Association, Canadian Pharmacists Association, Physicians For A Smoke-Free Canada, and the Ontario Medical Association, among other concerned organizations. Recipients were asked to write or fax their position on the proposed amendment to their MPs, Mr. Rock, and Prime Minister Jean Chrétien. ■

Pierre Fauchard Academy Commits \$5,000 To DCF

The Pierre Fauchard Academy will donate \$5,000 to the Dentistry Canada Fund (DCF) over the next five years.

To be provided in annual \$1,000 instalments, the money is earmarked for the Dentistry Canada Museum, which DCF administers and houses.

The first \$1,000 instalment was presented to DCF chairman Dr. Douglas Smith and museum curator Dr. P. Ralph Crawford in September.

"Since the academy is named after the founder of dentistry, Pierre Fauchard from France, we felt it would be most appropriate for us to support this project, which contains such a comprehensive reflection of the history of dentistry in Canada," said Dr. Kevin Roach, a Canadian Trustee of the Pierre Fauchard Academy, who made the presentation to Dr. Smith on behalf of the academy's Canadian fellows.

DCF is Canada's only national, charitable organization dedicated to optimal oral health for all Canadians. For further information, phone DCF at (613) 236-4763, or fax (613) 236-3935, or e-mail dcf-ottawa@sympatico.ca. ■

CDAnet Continues To Grow

CDAnet, CDA's electronic claims processing network, experienced considerable growth in 1997 with more than 1,300 new dentists signing on.

The number of carriers on CDAnet is also expanding. London Life joined the program in October, and Empire Life Insurance

Table 1
Companies Currently Accessible Via CDAnet and Their ID Numbers

Carrier	ID Number
Assure Health Inc. (formerly SHNS) Network	
Alberta School Employee Benefit Plan	000027
Canada Life	000014
Great West Life	000011
Maritime Life	000034
Mutual Group	000019
National Life	000021
Sun Life	000016
National Data Corporation (ACE) Network	
Aetna Canada	610070
Blue Cross (Ontario)	610047
Green Shield Canada	000102
Liberty Health	311113
London Life	000018
Manulife Financial	610059
Metropolitan Life	610069
Prudential	000036
Pacific Blue Cross (Version 3.0 only)	
CU&C	000101
MSA	000064

Company will be on-line in the near future. In addition, Maritime Medical Care and MCP Teledent have both expressed interest in offering CDAnet claims transmission to their clients this year, while Réseau ACDQ/CDAnet, a new network operated by Centre Dentaire on behalf of CDA and the Quebec Dental Surgeons Association, will begin serving the Quebec market in the coming months.

The new 4.0 version of the CDAnet software, which will now be launched in 1998 after unexpected delays, will bring even more carriers and features to CDAnet and Réseau ACDQ/CDAnet. For example, the new version will allow coordination of benefits, on-line responses to predeterminations, payment and summary reconciliations from carriers, and a new e-mail function that will facilitate communication between networks, carriers and dental offices.

Pacific Blue Cross, which was created by the recent merger of

MSA and CU&C, will begin accepting CDAnet-transmitted claims nationwide once version 4.0 is in place. Government programs, such as the Non-Insured Health Benefits (NIHB) and Ontario Social Services dental plan, may also become accessible through CDAnet in the future.

If you are unable to transmit to any of the carriers listed in **Table 1**, please contact your software vendor or CDAnet staff to correct the problem. In addition, please contact CDAnet staff at 1-800-267-9701 to update your record if you are leaving an office where you are registered for CDAnet, or if your address or telephone number change. ■

APPOINTMENTS

QDSA Elects New President

The Quebec Dental Surgeons Association (QDSA) has elected Dr. Micheline Blain as its new president.

Dr. Blain began working for QDSA in 1979. From 1984 to

1992, she served as assistant executive director, and in 1993 was appointed assistant to the president of professional affairs.



Dr. Micheline Blain

A former member of several QDSA administrative committees and councils, Dr. Blain is also a past-president of the Montreal Dental Society, and served on CDA's board of governors from 1986 to 1992. She has a private practice in Montreal.

Dr. Daniel Pelland, the outgoing president of QDSA, will continue in the position of executive director and work closely with Dr. Blain. ■

Former Journal Editor Named Chair Of DHCSWO

The District Health Councils of South West Ontario (DHCSWO) have elected Dr. Wes Dunn as their new chair.

Dr. Dunn was the editor of the *Journal of the Canadian Dental Association* from 1953 to 1958 and is an honorary member of CDA. He was also the founding dean of the University of Western Ontario's faculty of dentistry, and is a professor emeritus in its division of community dentistry. ■

ERRATUM

A News Update story published in the October 1997 issue of the *Journal* — Dean At U Of M Retires (63:667, 1997) — contains two errors. Dr. James N. Wright was head of the University of Manitoba's department of stomatology from 1986 to 1990 (not 1994), and was the director *general* (not the director) of dental services for the Canadian Forces. The *Journal* regrets the errors. ■

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The Canadian Dentists' Investment Program: More Choices Under One Roof

In the 1990s, consumers want more choices and, more importantly, they want to see their choices clearly. This month, with the launch of the new Canadian Dentists' Investment Program, Canadian dentists now have a virtually limitless series of investment options. At the same time, it has never been easier to put together a sound and complete investment program.

That's because the Canadian Dentists' Investment Program allows dentists to consolidate all their investments (registered and non-registered) in a single, comprehensive program.

The benefits of consolidation are numerous. First, you'll have access to a wider selection of investments including stocks, bonds and mutual funds. Second, you can easily transfer your existing investment portfolio, *completely intact*, into the Canadian Dentists' Investment Program *at no charge*. Third, consolidation means simplified record keeping, allowing you to clearly track important developments in your investment portfolio, such as changes in your asset mix and foreign content levels. But the most tangible advantage of consolidation may be the reduction or elimination of administrative costs which can, in effect, boost the return on your investments.

While the Investment Program's name is new, its key components have well-established roots. You

are no doubt already familiar with two of the CDA-sponsored investment plans that are now being offered under the Investment Program banner: the CDA Retirement Savings Plan (CDA RSP) and the CDA Retirement Income Fund (CDA RIF). These two plans offer a wide range of professionally managed investment funds and GICs of different terms. Both plans have been in existence for some time. For over 40 years, Canadian dentists, their families and their dental office staff have chosen the CDA RSP to help achieve their financial goals. And over the past five years, simply by rolling over their RRSPs into the CDA RIF, they have been able to withdraw income in retirement while continuing to earn tax-deferred returns on the balance of their savings.

Under the new Investment Program, an even wider range of RRSP- and RRIF-eligible investment funds will be added to the CDA RSP and CDA RIF throughout 1998. And, starting this month, a move from weekly to daily valuation of investment fund units (which has been requested by many investors) will make it easier for individuals monitoring unit price fluctuations to quickly identify their own buy/sell opportunities. To obtain daily unit values for CDA funds, call CDSPI's 24-hour recording (1-800-561-9401, ext. 524) or check the listings in the financial newspapers.

The Investment Program's three new components — the CDA Self-Directed RSP, the CDA Self-Directed RIF and the CDA Investment Account (a non-registered and, therefore, taxable securities trading account) — will be offered through the investment dealer Sun Life Securities Inc. and will be rolled-out across the country in 1998. Starting this month, investors in British Columbia, Alberta, Saskatchewan, Ontario, Nova Scotia, Prince Edward Island and Newfoundland will have access to the Investment Program in its entirety. The three new components will become available in the remaining provinces as Sun Life Securities Inc. completes the registration requirements.

Combined, all five program components allow you to satisfy your investment needs at all stages of life under one roof. The following list briefly highlights some of the advantages of the various components:

CDA RSP and CDA RIF

- over a dozen investment funds to choose from and the security of creditor protection in certain circumstances (additional funds to be introduced throughout 1998);
- exceptionally low fund management fees;
- absolutely no other charges: no front- or back-loads, no commissions, no service or transaction fees;

- daily valuation of fund units;
- cashable GICs that offer extremely competitive rates;
- the availability of additional GIC deposit protection (above the standard protection offered).

CDA Self-Directed RSP and CDA Self-Directed RIF

- a wide range of investment choices including over 400 mutual funds, individual stocks, bonds, Treasury bills, Canada Savings Bonds, term deposits, etc.;
- no annual administration fee and no minimum balance required;
- low commissions on executed transactions;
- free stock quotes and investment research, including company profiles, financial reports and stock performance information;
- investment guidance geared to your investment objectives, risk tolerance and investment knowledge.

CDA Investment Account (Non-Registered Investments)

- no foreign content restrictions;
- choice of investment accounts (cash, margin, option) to suit your investment style;
- all the advantages, excluding tax deferral, of the CDA Self-Directed RSP and the CDA Self-Directed RIF.

The Canadian Dentists' Investment Program is administered by CDSPI. It's an exceptional investment opportunity that's only available to members of CDA or the Ontario Dental Association (ODA). Eligible dentists, their immediate and extended families, their office staff members and staff members' families can participate in the Investment Program.

With better fund selection, access to investment research and guidance, low or no service charges, and registered and non-registered investments, the Canadian Dentists' Investment Program has truly broadened the investment horizons for Canadian dentists. For direction on how the new Investment Program can help you reach your own financial goals, call CDSPI at 1-800-561-9401, extensions 253, 255 or 256. ■

Preparing For the New RRSP Season

The beginning of a new year signals the start of a new RRSP season. However, few Canadians are ready to take advantage of this opportunity because they have fallen into the habit of making their contributions for the previous year at the beginning of the new year.

Although we're allowed a grace period that extends 60 days after the end of the tax year (for example, the contribution deadline for the 1997 tax year is March 1, 1998), it's not desirable to wait until the deadline. Rather, you should contribute as early in the current tax year as possible because this will make a big difference — amounting to thousands of dollars — in the size of your nest egg at retirement.

Here are some suggestions on how you can break the late contribution cycle this year and stay ahead in the years to come.

RRSP Contribution For 1997

If you are having difficulty finding the cash to make an RRSP contribution for 1997, consider borrowing the funds. Taking out a loan is worthwhile if the tax savings gained by making the contribution is greater than the interest you pay on the loan. And, in addition to the immediate tax savings, remember that as long as your investment remains sheltered in an RRSP, it will realize significant benefits from tax-deferred, compound growth.

You also have the option of placing existing (non-registered) investments that are currently held outside of an RRSP into your plan. Investments such as Treasury bills, Canada Savings Bonds, individual stocks and mutual funds that are RRSP-eligible can be transferred into a self-directed RRSP.

Keep in mind that contributing to your RRSP in this manner can increase your tax bill if, for instance, you transfer an investment that has accrued capital gains since it was first purchased. It is also worth noting that if you have enough cash later in the year, you can buy back the transferred investment from your RRSP at its fair market value. In effect, you replace it with cash. Again, there are potential tax consequences and you should explore these with your tax advisor before you proceed.

RRSP Contributions For the Current Tax Year...and Beyond

Once your contribution for 1997 is taken care of, you can plan ahead so you won't be making a last minute contribution for the 1998 tax year.

When your income tax refund (generated by your 1997 RRSP contribution) arrives in the spring, use it to make a lump sum deposit to your RRSP. Even before that, however, you can start making regular monthly contributions to your RRSP. These are easier to budget for, especially if you choose a "forced savings plan." You won't miss the cash if it goes straight from your bank account directly into your RRSP.

The CDA RSP and CDA Self-Directed RSP provide a convenient, monthly investment option at no extra charge. Once you decide how much you want to regularly set aside in your RRSP through the Canadian Dentists' Investment Program each month, simply call CDSPI to confirm the arrangements. Call 1-800-561-9401, extension 253, 255 or 256 and ask about our Pre-Authorized Chequing Option. (Opening a new CDA RSP account requires an initial \$50 RRSP contribution and only a few moments of your time. Subsequent deposits can be as low as \$25 each.)

Sowing the seeds of consistent and timely RRSP contributions will allow you to reap the fruits of efficient and effective RRSP planning right now and for many years to come. ■

CDA RSP — THE PERFORMANCE RRSP

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CDA Fund Performance[†] (for period ending November 30, 1997)

CDA GROWTH FUNDS	1 year	3 years	5 years	10 years
Canadian				
Aggressive Equity Fund (Altamira)	18.2%	19.8%	n/a	n/a
Common Stock Fund (Altamira)	3.1%	9.8%	10.9%	9.1%
Canadian Equity Fund (Trimark) ^{††}	2.3%	13.6%	15.9%	13.4%
Special Equity Fund (KBSH)*	47.6%	42.8%	41.2%	n/a
International**				
Emerging Markets Fund (KBSH)	-27.0%	n/a	n/a	n/a
European Fund (KBSH)	15.4%	n/a	n/a	n/a
International Equity Fund (KBSH)	1.4%	n/a	n/a	n/a
Pacific Basin Fund (KBSH)	-6.2%	n/a	n/a	n/a
US Equity Fund (KBSH)*	27.7%	27.0%	18.8%	16.2%
Global Fund (Trimark) ^{††}	18.3%	17.8%	18.8%	18.6%
CDA INCOME FUND				
Bond & Mortgage Fund (Canagex)	5.2%	11.3%	9.2%	10.5%
CDA CASH AND EQUIVALENT FUND				
Money Market Fund (Canagex)	2.7%	4.9%	5.1%	7.4%
CDA GROWTH AND INCOME FUND				
Balanced Fund (KBSH)	10.5%	15.5%	12.0%	10.7%

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historical rates based on past performance and are not necessarily indicative of future performance.

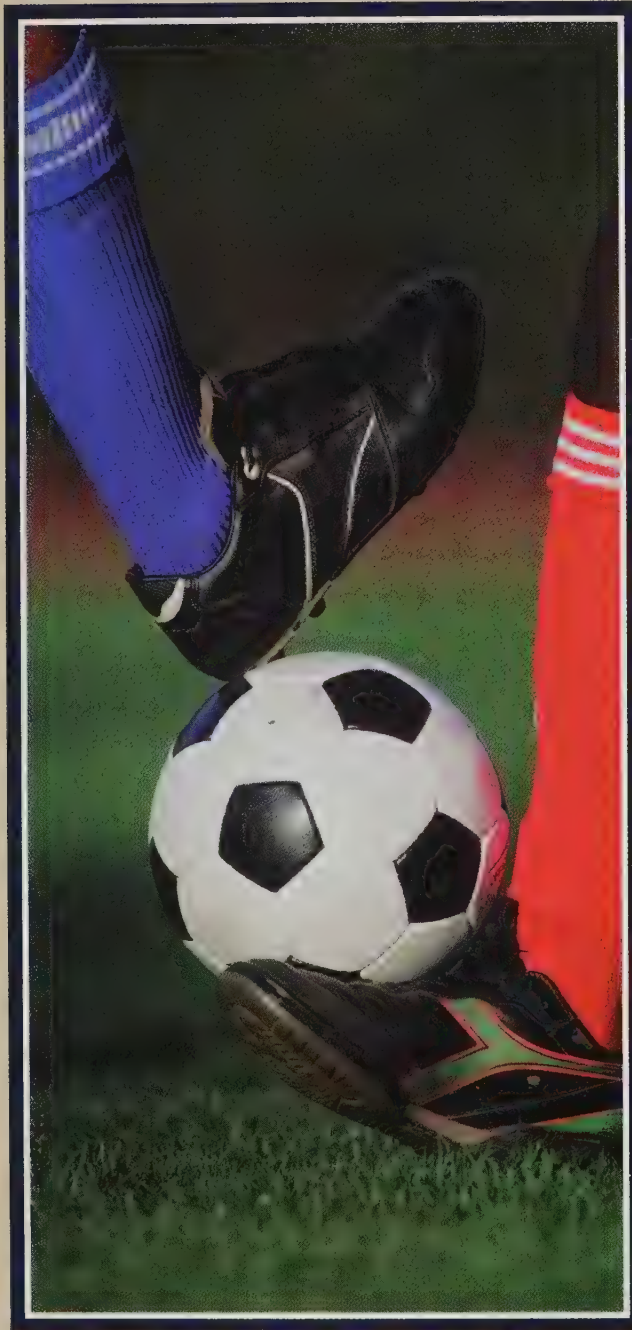
^{††} The rates of return shown for the Canadian Equity Fund (Trimark) and the Global Fund (Trimark) are based on the returns of the Trimark Canadian Fund and the Trimark Fund respectively, the mutual funds in which those CDA funds invest. Returns are historical and are after deduction of management fees. As a result, the performance results differ from those published by Trimark Investment Management Inc.

* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

** These funds are subject to foreign content limitation.

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And, when you also consider all the professional benefits membership in CDA delivers, such as issues management, practice management, national publications and topical seminars, is it any wonder that the majority of Canadian dentists actively support their national association?

To get more information on CDA member benefits, just give us a call or e-mail us at reception@cda-adc.ca or visit our Web site at www.cda-adc.ca.

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RESEARCH



Interobserver Variability In Pediatric Radiographic Quality Assessment

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ABSTRACT

Programs to monitor radiographic quality have been established in several Canadian provinces. These quality assurance programs depend in part on the evaluation of technical radiographic errors. Interobserver variability in the assessment of these errors reduces the reliability of such information. This study examined the interobserver variability of three dental specialists involved in documenting radiographic technical errors, and the need for retakes following the initial radiographic surveys of 200 children. Observers were trained and calibrated to standardize the evaluation of errors. The overall frequency at which errors were found in bitewing radiographs was consistent with the results of previous studies, but the number of periapical and panoramic technical errors was low. Interobserver variability occurred in the recording of radiographic technical errors, primarily in the recording of bitewing errors. There was also interobserver variability in the ordering of retakes. The interobserver variability in the assessment of radiographic quality could not be eliminated, despite prior observer training. This could indicate that the decision to retake a radiograph may be based on subjective criteria, especially in the absence of clinical information.

Introduction

The radiographic interpretation of dental disease depends on the availability of high-quality images that are free of technical and processing errors. Such errors are common, however, and may compromise the radiographic information available to the dentist.

Several provincial dental associations and colleges, including British Columbia, Alberta and Ontario, are either developing or have already published guidelines on monitoring radiographic quality. The resulting quality assurance programs involve monitoring X-ray exposure and processing quality, as well as conducting a retake/reject analysis of all radiographs exposed in the dental office.

Other studies have reported on the frequency and type of intraoral radiographic technical errors made by dental students in a clinic setting¹⁻³ and dentists in private practice,⁴⁻⁹ as well as on the occurrence of panoramic technical errors.^{10,11} Documenting and correcting technical errors is a necessary part of any radiograph quality assurance program, although interobserver variability in assessing errors will reduce the reliability of information.

Retaking a radiograph has implications for both the dental patient and the dentist. The patient is exposed to more ionizing radiation, and the dentist's overhead is increased due to wasted time and manpower.

Noting the occurrence, frequency and types of technical errors that occur in practice, and documenting them as part of a quality assurance program, helps the dental team to identify and correct technical deficiencies. In turn, this reduces the number of retakes resulting from those errors.

This study investigated interobserver variability in the documentation of radiographic technical errors, and the need for retakes. Three observers, from three different dental specialties that commonly provide dental care to the pediatric population, participated in the research. The resulting data are important, because they make it possible to quantify the number and type of technical errors in radiographs that other dentists have previously judged to be clinically acceptable. In addition, the study findings test the accepted methods of compiling quality assurance data, particularly with respect to scoring errors, and provide information on specialist interobserver variability in recording radiographic quality.

Table I

Radiographic Error Definitions

Error	Definition
Bitewing and periapical radiographs	
<i>Film placement</i>	
Too posterior	Premolar projection does not image contact of cuspid with first premolar.
Too anterior	Premolar projection imaged further anterior than middle of cuspid tooth; molar projection did not image all molars.
Too coronal/apical	Periapical projection did not image entire root; bitewing projection did not image interproximal crestal bone in one arch.
Slanting	Occlusal plane slants to the extent that interproximal crestal bone is not visible on one or more teeth.
<i>Horizontal and vertical angulation</i>	
Overlapped interproximal contacts (bitewings only)	Some or all interproximal contacts are overlapped to the extent that the dentoenamel junction is not clearly visible and a second bitewing projection showing the open contact is not available.
Foreshortening	Marked shortening/superimposition of one or more teeth.
Elongation	Marked lengthening of one or more teeth such that apices are not visible.
Cone cutting	Unexposed area due to misalignment of collimator and film.
<i>Density/contrast</i>	
Film density	Assessment of darkness/lightness of image where error is of sufficient magnitude to affect diagnostic usefulness of radiograph.
<i>Processing faults</i>	
Processing	Artifacts from various processing errors such as film overlap marks, fog, roller marks, static electricity, poor fixation.
<i>Other</i>	
Patient/machine movement	Blurred image due to movement of patient or X-ray machine during exposure.
Film backward	Reduced density of image with marks from lead foil due to backward placement in mouth.
Unnecessary exposure	Two radiographs present (either both bitewings or both periapicals) which imaged same teeth in same orientation and provided duplicate information.
Poor film handling	Artifacts — e.g. bending film, fingernail marks.
Other	e.g. double exposure, artifacts from not removing eyeglasses.
Panoramic radiographs	
Density/contrast	As for bitewing and periapical radiographs.
Processing faults	As for bitewing and periapical radiographs.
Positioning	Improper head position in vertical, horizontal, or anterior-posterior planes resulting in distortion of image.

Table II

Intraoral Radiographs Taken At Initial Appointment (200 Patients)

Type/number of radiographs	Number of patients	Per cent
Bitewing (total = 451)		
2	168	84.0
3	13	6.5
4	19	9.5
Periapical (total = 46)		
0	170	85.0
1	21	10.5
2	6	3.0
3	1	0.5
4	1	0.5
6	1	0.5
Occlusal (total = 7)		
Maxillary	5	2.5
Mandibular	2	1.0
Panoramic	200	100

Methods and Materials

Radiographs obtained during a 1996 study¹² were used to complete the current investigation. Following parental or guardian consent, initial radiographic surveys were performed on 200 consecutive pediatric patients, aged 5 to 16 years, who had presented for treatment at the University of Alberta dental school. The resulting exposures, which included at least one panoramic and two bitewing radiographs, were assessed by a pedodontist, orthodontist and oral radiologist. In some cases, additional radiographs were taken. After being judged to be diagnostically acceptable by clinical instructors, all available radiographs were included in the study material.

The intraoral radiographs were exposed by dental students using GE-1000 (General Electric Co., Milwaukee, Wis.) intraoral X-ray units operated at 80 kV and 15 mA; and Kodak DF-58 film (Eastman Kodak Co., Rochester,

N.Y.). Following exposure, the radiographs were processed using a Dentx 810 Basic automatic dental film processor (AFP Imaging Co., Elmsford, N.Y.).

All periapical radiographs were taken with Rinn XCP instruments (Rinn Corporation, Elgin, Ill.) and/or Snap-A-Ray film holders (Rinn Corporation, Elgin, Ill.), using the long cone paralleling technique. Bitewing radiographs were exposed without using position indicating devices. Most panoramic radiographs were exposed by a radiology technician using a Siemens Orthophos panoramic unit (Siemens Aktiengesellschaft, Munich, Germany); Fuji RXO-G film (Fuji Photo Film Co. Ltd., Japan) with Lanex regular screens (Eastman Kodak Co., Rochester, N.Y.); and processed using a Kodak X-OMAT M20 automatic film processor (Eastman Kodak Co., Rochester, N.Y.). All processing was performed under standardized conditions. Daily densitometry and sensitometry measure-

ments were made to verify consistent processing conditions.

At the outset of this study, all radiographs were removed from the patients' charts and placed in separate envelopes labelled with the respective patient's sex, age and chart number. The radiographs were viewed using a standard viewbox in a darkened room.

To define the error interpretation criteria for the study, and promote both uniformity in observations and accuracy in data collection, observer training and calibration was conducted before the observers reviewed the actual study cases. The training and calibration was performed using radiographs from cases that were not included in this study. After receiving the radiographs, observers independently recorded their findings using a technique error checklist developed specifically for this study (Table I). Each finding was immediately compared. If there was disagreement, the observers reviewed the radiograph together and reached a consensus before proceeding to the next case. Through this process, a definition for each technical error was produced and agreed to by the observers. The ultimate goal was to reduce interobserver variability when the actual study cases were assessed.

Observers began interpreting the radiographs for the study cases within a week of training and calibration. They were asked to record technical errors on the checklist for all radiographs, and subjectively decide if retakes were indicated based on the perceived magnitude of the technical error.

All data was coded and edited. Verification of the information collected was performed on a random sample of 10 per cent of the cases. Comparisons between observers were done by chi-square and Cochran's Q test. Tests of significance were at the $p < 0.01$ level.

Results

The initial radiographic surveys of 200 children (97 females and 103 males), aged 9.95 ± 2.9 years (range 4.5 to 15.5 years), were

evaluated for radiographic technical errors. **Table II** lists the types and numbers of radiographs exposed. Panoramic and bitewing radiographs were available for every case. From one to six periapicals were available for 15 per cent of patients, and occlusal projections were available for 3.5 per cent.

Table III shows the type and frequency of bitewing technical errors recorded by each observer. "Film too posterior" (32 per cent average) and "interproximal contact overlap" (30 per cent average) were the errors most frequently recorded by all observers. The pedodontist noted more bitewing technical errors than the other specialists, recording significantly ($p < 0.01$) more errors in film positioning (too posterior), film density and patient movement. The orthodontist recorded significantly ($p < 0.01$) more overlapped interproximal contacts and significantly ($p < 0.01$) fewer film positioning (too anterior) errors than the other specialists. The radiologist only differed significantly ($p < 0.01$) from the others in recording more film slanting errors.

There were no significant differences between observers in reporting the types of errors they identified in the periapical images, but considerably fewer total errors of this nature were recorded (pedodontist 2.5 per cent, orthodontist 5.0 per cent and oral radiologist 6.0 per cent) than for the other images (**Table IV**). "Foreshortening," "cone cutting" and "film density" errors were most frequently recorded.

On average, the most frequent panoramic technical errors recorded by all observers were "patient positioning" (9.0 per cent) and film density errors (7.5 per cent). The radiologist recorded the highest number of panoramic technical errors ($n = 44$) compared to the pedodontist ($n = 37$) and orthodontist ($n = 25$) (**Table V**). However, the orthodontist recorded significantly fewer ($p < 0.01$) errors in patient positioning than the pedodontist or the oral radiologist.

Table VI shows the percentage of retakes that each specialist

Table III

Type and Frequency (Per Cent) Of Bitewing Technical Errors Recorded By Specialist

Bitewing error	Pedodontist	Orthodontist	Radiologist
Film too posterior	48.0 ¹	25.5	23.5
Film too anterior	13.5	2.5 ²	10.0
Film too coronal or apical	12.5	11.0	9.5
Film slanting	12.5	12.5	22.0 ³
Overlapped interproximal	29.5	36.5 ⁴	23.5
Cone cutting	4.5	5.5	4.5
Film density	12.5 ¹	6.5	3.5
Processing	3.5	5.0	5.5
Patient movement	7.5 ¹	2.5	2.0
Unnecessary exposure	0	1.0	2.0

Significant difference = $p < 0.01$

¹ Pedodontist different from both orthodontist and radiologist.

² Orthodontist different from both pedodontist and radiologist.

³ Radiologist different from both pedodontist and orthodontist.

⁴ Orthodontist different from radiologist.

No cases of foreshortening, elongation, machine/patient movement, film backward or poor film handling were noted.

would order based on the overall quality of the initial surveys. The orthodontist found a significantly lower percentage (56 per cent) of radiographs to be of satisfactory quality ($p < 0.01$) compared to the pedodontist (87.5 per cent) and radiologist (89.5 per cent). As a result, the orthodontist ordered significantly more retakes ($p < 0.01$) of bitewings than the other specialists. Of all the radiographic exposures, bitewing retakes were most commonly requested regardless of the observer's specialty.

Discussion

Although radiographic quality studies have been published before, this is the first such study to investigate interobserver specialist variability in recording each type of technical error. It is also one of the few studies where observers

participated in a pre-study training and calibration exercise.

Despite only involving three observers, the results of this study illustrate that interobserver variability in assessing radiographic quality can still occur after the calibration of observers. Our decision to use a pedodontist, orthodontist and radiologist as observers was based on the fact that the patient population was from the pedodontic clinic. However, future studies using a larger number of observers, including general practitioners and a more varied patient population, should be conducted to more accurately determine the degree of interobserver variability in recording technical errors and the decision to order retakes.

Variation in the observers' judgment of radiographic quality has been suggested as a factor

Table IV

Type and Frequency (Per Cent) Of Periapical Technical Errors Recorded By Specialist

Periapical error	Pedodontist	Orthodontist	Radiologist
Film too posterior	0	0.5	0
Film too anterior	0	0	0.5
Film too coronal or apical	0	0.5	0
Film slanting	0.5	0.5	0
Foreshortening	0.5	1.0	2.5
Cone cutting	0.5	0.5	1.5
Film density	1.0	0.5	1.0
Unnecessary exposure	0	1.0	0
Processing	0	0.5	0.5

No cases of elongation, machine/patient movement, film backward or poor film handling were noted.

Table V

Type and Frequency (Per Cent) Of Panoramic Technical Errors Recorded By Specialist

Panoramic error	Pedodontist	Orthodontist	Radiologist
Film density	6.5	7.0	9.0
Processing	2.0	1.0	0
Patient positioning	10.0	4.5 ¹	13.0

Significant difference = $p < 0.01$

¹ Orthodontist different from both pedodontist and radiologist.

Table VI

Type and Frequency (Per Cent) Of Retakes Recommended By Specialist

Retakes	Pedodontist	Orthodontist	Radiologist
None — quality satisfactory	87.5	56.0 ¹	89.5
At least one bitewing	12.0	42.0 ¹	10.0
At least one periapical	0	1.0	0
Panoramic	0.5	0.5	0
Mandibular occlusal	0	0.5	0.5

Significant difference = $p < 0.01$

¹ Orthodontist significantly different from both pedodontist and radiologist.

contributing to the disparate results of other studies.^{2,3,5,7} A calibration exercise was conducted at the outset of this study in an attempt to decrease interobserver variability and promote uniformity in reporting technical errors.

All radiographs evaluated in this study had previously been judged to be of adequate diagnostic quality by clinical instructors. These instructors were excluded from the calibration exercise. Some of the radiographs evaluated may have been retakes, but there was no mechanism of determining this.

Despite calibration, there was interobserver variability in the recording of radiographic technical errors. Overall, the pedodontist recorded more errors than the orthodontist and radiologist for all types of projections. The reason for this difference is not clear, but it could be related to bias. In a clinical situation, the pedodontist would have to rely on the radiographic evidence, to a certain extent at least, to develop a restorative treatment plan.

Because of the high number of bitewing radiographs available (451), it is not surprising that all three observers recorded bitewing technical errors most frequently. The frequency at which technical errors were observed in the bite-wings evaluated in this study is consistent with the findings of other studies, where incorrect film placement and interproximal contact overlap were the most common technical errors.^{2,3,5-7}

The frequency at which technical errors were observed in the periapical radiographs was low, ranging from 0 to 2.5 per cent. This is partially related to the relatively low number of periapicals evaluated, and the fact that some of these periapicals may have represented retakes where previous errors were corrected.

There was low interobserver variability in recording the frequency of panoramic technical errors, and there was no significant difference among observers in the number of panoramic retakes recommended. The frequency of panoramic errors recorded in our study is lower than

the frequency observed by other studies.^{10,11} This finding may be related to the quality assurance program that is adhered to by the University of Alberta's radiology clinic, which reduces processing errors. In addition, the panoramic radiographs used in this study were performed by, or under the supervision of, a radiology technician, which likely increased the technical consistency.

The presence of a technical error does not always indicate that a radiograph must be retaken. A decision to retake a radiograph implies that the technical error is of sufficient magnitude that it compromises the diagnostic information in the radiograph.

Although observer calibration was done in an attempt to standardize the recording of error frequency, the decision to retake a radiograph was subjective and based on observer judgment. Normally, a decision to order retakes is based on both radiographic quality assessment and clinical information. Because no clinical information was provided to our observers, their decision to retake a radiograph was based solely on the perceived magnitude of the technical error. We recognize that this does not accurately reflect normal clinical practice.

Despite some technical errors, the overall quality of the bitewings evaluated in our study was rated very high by two observers. Retakes were recommended in only 10 per cent of cases by the radiologist, and 12 per cent of cases by the pedodontist. The orthodontist requested a significantly higher number of bitewing retakes, however, even though there were generally no significant differences in how he scored the frequency of bitewing technical errors relative to the other two observers. The reason for this discrepancy is not clear, but it strengthens the argument that the ordering of retakes is subjective, particularly if clinical information is not available or inadequate.

The number of technical errors found in this study suggests that clinical radiographic acceptance criteria are not being used uniformly, and that there is still consider-

able subjectivity in determining whether radiographic surveys are clinically acceptable. Our results should be interpreted with some caution, however, since the observers had no clinical information.

Despite the small number of observers used in our study, the frequency and types of technical errors recorded were consistent with other reports in most instances.¹⁻⁶ This indicates that our error definitions and scoring method were adequate, and that our method of gathering data is appropriate for recording radiographic quality assurance data in dental offices.

Although observer training and calibration was conducted, there was interobserver variability in recording technical errors. Such variability may affect clinical quality assurance statistics and, more importantly, the frequency of retakes. This is especially important, particularly since all retakes in this study would have been taken on children. The effect of bias due to the respective clinical specialty of the observers is unknown, but it may have been a factor, along with the absence of clinical information, in the number of retakes they ordered. ■

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INFECTION CONTROL



Elimination Of Microorganisms From Dental Operator Compressed Air

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ABSTRACT

Compressed air is used to power high-speed handpieces, as well as to dry and clean surfaces in the oral cavity during patient treatment, in all dental operatories. The compressed air used in the dental operatories located in large institutions such as universities or hospitals is generally obtained from a central source, and is produced by continually running compressors. In operatories located in private practice settings, compressed air is obtained from small on-site air compressors, which may be run less frequently. A survey was made of operatories in the Montreal area to determine the microbial load of the compressed air produced by air compressors. An air sampler was used to collect compressed air and impinge it on a rotating agar medium surface. Compared to the air produced from compressors in constant use, the air collected from compressors that ran intermittently had a very high microbial load. The efficacy of an apparatus designed to sterilize the contaminated air produced by small, on-site compressors was tested. Called a Purilair, this device heats every particle of inflowing compressed air to 250°C and then forces it through a fine-pore ceramic filter. In three private practice operatories, an in-line Purilair effectively sterilized the air being delivered by small compressors.

The same result was obtained in the laboratory when lyophilized spores and cells of *Bacillus stearothermophilus* and conidia of *Penicillium notatum* and *Aspergillus niger* were sprayed into the intake line of the apparatus.

Introduction

In the past 30 years, the high-speed dental air turbine drill has become an indispensable instrument for the dentist, and is used in virtually every clinical procedure from surgery to bonding. Recently, however, public health concerns have arisen due to the release of contaminated aerosols from high-speed turbine drills, and the resulting potential for cross-infection to occur in the operator.

Ongoing laboratory investigations support these concerns. In both a closed dental operator and a multi-chair dental clinic, Grenier found that the aerosols released during dental treatment caused a significant increase in the level of bacterial air contamination.¹ However, the current epidemiological evidence indicates that infectious diseases — especially those caused by blood-borne pathogens — are not transmitted from patient to patient via dental instruments.²

Nevertheless, to reduce the possibility of cross-infection, the Centers for Disease Control and Prevention (CDC) in Atlanta has

recommended that dentists use either an enclosed container or high-velocity evacuation to minimize the spread of the spray, spatter and aerosols that may be discharged from high-speed handpieces during dental procedures.³

The high-speed drills used in dental practice are driven by compressed air, which is generated by air compressors. To our knowledge, however, no comprehensive studies have been done to determine whether these air compressors contribute to the overall microbial load in the pressurized air they put out.

There are two sources for the microorganisms found in compressed air. First, when an air compressor draws in atmospheric air, it also receives the contamination⁴ and water vapor contained in that air. Second, microorganisms can grow in the residual water that may be present inside the compressor itself. This is more likely to occur when the compressor is used infrequently and condensation accumulates in the apparatus, which may contribute to liquid moisture being present in the air lines.⁵

When contaminated pressurized air is used at 30 to 40 psi, microbes will be impinged on open surgical sites. The use of disinfectants and antibiotics, or the patient's nonspecific immune system (macrophages, etc.), will eliminate these microbes in the

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Fig. 1: A close-up view of the modified microbiological air sampler. A plastic dome (arrow) is fitted over the slit barrel. Air particles (including microorganisms) are impinging on the surface of the rotating agar medium in a 150 mm x 15 mm Petri plate.



Fig. 2: The set-up for evaluating the Purilair in the laboratory. On the left is a vacuum pump. The microbiological air sampler is in the centre, and the Purilair apparatus (inside view with door removed) is on the right. Vacuum action feeds air from the Purilair into the sampler. Challenge microorganisms were inoculated into the intake of the Purilair. The treated air emanating from the output of the apparatus was tested for the presence of viable microbes.

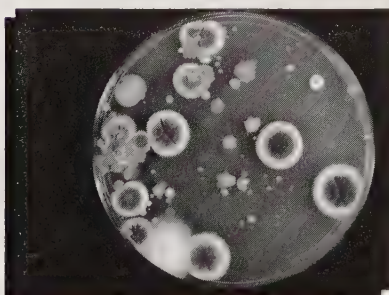


Fig. 3: Brain heart infusion agar medium exhibiting a mixture of the microorganisms recovered from compressor air.

majority of cases. However, even a single planted microbial cell could theoretically cause a fulminating infection in an immunocompromised patient. Underlying medical problems such as diabetes mellitus or chronic alcoholism may bring about an im-

munocompromised state in patients.⁶

Since the development of the high-speed air turbine dental handpiece in the 1960s, however, there have only been sporadic reports of major thoracic complications associated with the release of pressurized air in the dental office. Ely et al⁷ presented case studies of four patients who experienced intrathoracic complications after undergoing dental procedures involving the use of a dental drill. One of these patients was infected by Group A β -hemolytic streptococci, and died 17 days after receiving dental treatment. Another was infected with *Fusobacterium necrophorum*, but recovered after a six-week course of penicillin therapy. Both patients were young and healthy prior to undergoing dental work.

Medical complications resulting from the release of pressurized nonsterile air by dental handpieces frequently go undiagnosed and unreported, and likely occur more often than we realize. Consequently, we undertook a study to assess the microbial load in the pressurized air emanating from the air compressors used in various dental operatories in the Montreal area. In addition, we conducted an investigation to assess the ability of a novel apparatus to completely eliminate the microorganisms contained in this air.

Materials and Methods

Dental Operatories

Nine dental operatories, including McGill University's campus mini-clinic, the student clinic at the Montreal General Hospital, and seven private practice operatories in the Montreal area, were surveyed to assess the microbial load of the pressurized air produced by air compressors.

Air Sampling

The pressurized air produced by the surveyed operatories' air compressors was tested for microbial contamination using a modified Microbiological Air Sampler Model STA-100 (New Brunswick Scientific Co., Inc., Edison, N.J.). A plastic dome was fitted tightly over the slit

barrel of the device, as shown in **Fig. 1**. Compressor air was fed into the dome (at 25 litres/min), and forced through a narrow slit situated over a solid culture agar medium plate. The plate was rotated at a uniform speed (a complete rotation of the plate took 60 min). Microorganisms in the pressurized air were impinged on the agar medium surface, and formed colonies after incubation.

Two agar media, in 150 mm x 15 mm plastic plates, were used in the study. Brain heart infusion agar medium was used for growing and counting bacterial colonies. Rose Bengal agar supplemented with Antimicrobial Supplement C was used for isolating and enumerating yeasts and molds. Both media were purchased from Difco Laboratories, Detroit, Mich.

Bacterial Numbers In Accumulated Compressor Water

Water deposits may occur due to the accumulation of condensation in the compressor chamber. This water was collected by opening the drain valves of several small operatorial compressors. The resulting samples were diluted out serially, and aliquots were inoculated onto surfaces of brain heart infusion agar medium. After incubation at room temperature for 48 hours, the number of bacterial colony forming units (CFUs) was enumerated for each sample.

Challenge Microorganisms

To obtain a high concentration of cells and endospores, thermophilic *Bacillus stearothermophilus* was grown in one litre of brain heart infusion broth (Becton Dickinson, Cockeysville, Md.) at 56°C to the stationary phase. The presence of spores was confirmed by heated malachite-green staining, and the culture was pelleted by centrifugation, resuspended in 10 mL of sterile 20 per cent skim milk, and lyophilized. In addition, using a spatula, conidia were scraped off the surfaces of mature mold colonies of *Aspergillus niger* and *Penicillium notatum*.

Compressor Air Sterilization

An apparatus designed to sterilize compressor air, called the Purilair (Purilair, Inc., Montreal, Que.),

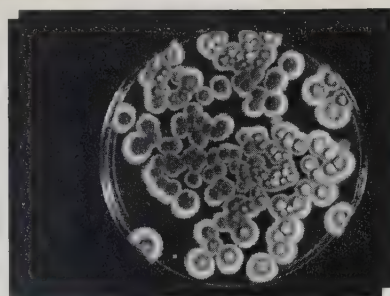


Fig. 4: Rose Bengal agar medium exhibiting fungal colonies recovered from compressor air.

had been installed in some dental operatories in the Montreal area. In these operatories, compressor air that had passed through the Purilair was tested for the presence of microorganisms in the same way as the air coming directly from the compressors. In addition, a recent model of the Purilair was challenged with viable spores of *B. stearothersophilus* and the fungi *A. niger* and *P. notatum* to test its efficacy in sterilizing compressor air. The set-up for this testing is shown in **Fig. 2**. In principle, the Purilair works in this manner: every air particle from a compressor is heated to 250°C and forced through a heated, candle-shaped ceramic cylinder. Microorganisms are either killed by heat or removed by filtration before

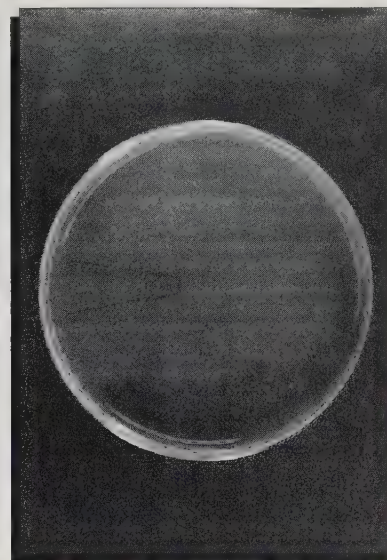
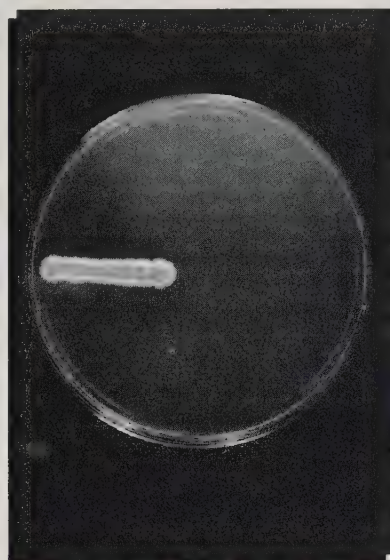


Fig. 5: Left: The growth of a line of mold conidia that was inoculated directly into the microbiological air sampler, and impinged on to Sabouraud dextrose agar through the slit barrel. Right: No viable microorganisms were recovered from Purilair-treated air.

the pressurized air is fed into the operatory's air lines.

Results

The numbers of bacteria, yeasts, and molds isolated from the compressor air of different dental operatories are given in **Table I**. One-thousand litre samples of compressor air were tested. Although the air obtained from frequently used compressors was virtually free of microorganisms (samples one, two and nine), the

air obtained from intermittently used compressors contained bacteria, yeasts and molds. **Fig. 3** shows the microorganisms recovered from compressor air on brain heart infusion agar medium (from dental clinic four), and **Fig. 4** shows the molds recovered on Rose Bengal agar medium (from dental clinic six).

No attempt was made to identify the recovered bacteria to the species level, since all bacteria are potential opportunists even if they

Table I

Number Of Bacteria, Yeasts and Molds Isolated From Compressor Air Lines In Dental Operatories (Number Of Colony-Forming Units Per 1000 Litres Of Compressor Air)*

Dental clinic sample number	Number of bacteria	Number of yeasts	Number of molds	Compressor usage
1	—	—	—	Frequent use
2	—	—	—	Frequent use
3	320	150	37	Intermittent use
4	65	2	19	Intermittent use
5	20	3	21	Intermittent use
6	31	12	379	Intermittent use
7	13	—	7	Intermittent use
8	11	2	9	Intermittent use
9	—	—	1	Frequent use

* Average of duplicate values

Table II

Percentage Distribution Of Gram-Stained Bacteria Isolated From Compressed Air In Dental Operatories

Dental clinic sample number	Gram-positive rods	Gram-negative rods	Gram-positive cocci	Gram-negative cocci
3	2.3	72.7	13.6	11.4
4	—	74.4	3.7	22.0
5	—	72.7	9.1	4.5
6	—	73.9	—	26.1
7	—	70.0	10.0	20.0
8	—	75.0	8.8	16.2

are not true pathogens. However, some generalizations can be made concerning the bacterial isolates.

As seen in **Table II**, very few gram-positive rods were isolated. The majority of the bacterial strains were gram-negative rods, mostly of the pleomorphic short and thick bacilli varieties. Some gram-positive and gram-negative cocci were also isolated.

Colonial morphology and microscopic examination of slide cultures indicated that the genera of the molds isolated from compressor air included *Rhizopus*, *Nigrospora*, *Penicillium*, *Cladosporium*, and *Aspergillus*. Similar techniques determined that the yeast strains contained in this air included *Rhodotorula* and *Saccharomyces*.

In dental clinics three, four and five, two sets of air samples were tested. The first set of samples was obtained directly from the air compressors. All of these samples yielded CFUs of microorganisms (**Table I**). However, the compressors in each of these clinics were equipped with a Purilair apparatus. The second set of samples was obtained after the air had been treated by the Purilair. All of these samples were tested in the same way as the samples taken directly from the compressors, and all of them were completely sterile or free of microbes.

Water had accumulated in some compressors due to condensation. In a second set of tests, this water was analysed for its bacterial content. On average, it yielded 4×10^4 CFU/mL.

In addition, the Purilair was challenged in the laboratory using large inocula of *B. stearothermophilus* cells and endospores, as well as the conidia of *A. niger* and *P. notatum*. As shown in **Fig. 5**, the air emanating from the apparatus was found to be devoid of microorganisms.

Discussion

In many small dental practices, pressurized air is obtained from air compressors that are not in constant use. This air can be a source of microorganisms, which may be introduced into open surgical sites during dental procedures. However, as shown in **Table I**, this air was not considered to be heavily loaded with microbes. Only 320 CFUs of bacteria were recovered from the 1,000 litre air sample obtained at dental clinic number three, for instance, and 379 CFUs of molds were recovered in the sample from dental clinic number six.

The recovered microbes were most likely saprophytes, which can thrive or grow in a moist compressor chamber, and then be transported by the compressor air into the air lines feeding the operatory.

In small dental operatories, air compressors are often situated in remote locations, such as a basement, cabinet, or closet. Cleanliness is often overlooked in these locations. However, the microorganisms found in this environment are taken into the compressor with atmospheric air. Furthermore, any direct water contamination due to condensation will add to the microbial load.

A high potential for water contamination was found at 58 per cent of the sites sampled in a recent study of the compressor air from 36 dental clinics in eight U.S. states.⁸ This is of concern, as we have shown that the condensation accumulated in air compressors contains high counts of bacteria.

Saprophytic microorganisms are mopped up by the reticuloendothelial system in most cases, and cause no harm to the patient. However, we live in an era with a high incidence of immunocompromising diseases. Even small numbers of saprophytes may ultimately be dangerous to the patient, as they may prove to be opportunistic pathogens. For example, *Aspergillus* has become an increasingly important concern in severely debilitated patients with altered host defences, including leukemia, lymphoma, organ transplant, and bone marrow transplant patients. The colonization of the mold in the body cavities of these patients could lead to invasive granulomatous disease of the lungs, or to disseminated systemic infections that are usually fatal.⁹ Furthermore, when patients are in an immunocompromised state, intrinsic pathogens have greater potential to cause disease due to the diminished host immune response.

Since the air-driven dental handpiece was introduced in the 1960s, the literature has contained sporadic anecdotal reports on various medical complications associated with its use in immunocompromised and even healthy

patients. The case reports by Ely et al are notable.⁷

It would clearly be to our patients' advantage if we had a reliable method of eliminating the microbes from compressor air. The Purilair, which essentially heat sterilizes and filters the air supplied by the compressor before allowing it to enter the operatory's air lines, appears to meet this objective. Samples of Purilair-treated air obtained from dental clinics three, four and five were tested, and no microorganisms were recovered. This apparatus will also eliminate many of the other types of contaminants that can be transported in compressed air, including particulate material from ambient air, oil or hydrocarbon vapor, and water droplets⁵ (which result from condensation, and have been shown to be loaded with microorganisms). ■

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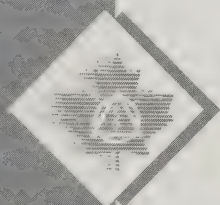
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CLINICAL



Lateral Periodontal Cyst: A Case Report and Review Of the Literature

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ABSTRACT

A polycystic lateral periodontal cyst was observed over a period of 25 months. The case history, a description of the natural history of this lesion and its diagnostic characteristics, and a review of the literature are presented.

Introduction

Schafer et al¹ define a "cyst" as an epithelial-lined pathologic cavity that usually contains fluid or semisolid material. An odontogenic cyst is derived from either the odontogenic epithelium that is present prior to tooth development, or from the remnants of the odontogenic epithelium that remain after tooth formation is complete.

Three reservoirs of odontogenic epithelium can develop into odontogenic cysts: rests of Malassez; reduced enamel epithelium; and dental lamina. These reservoirs represent logical categories for the histogenetic classification of odontogenic cysts (Table I).²

The lateral periodontal cyst (LPC) is a relatively uncommon developmental cyst, and accounts for less than one per cent of all cysts found in the jaws.³ Because its clinical and radiologic features are often typical, the clinician can diagnose LPC with reasonable certainty (Table II).

However, microscopic diagnosis is essential, as other lesions may have a similar presentation (Table III). Based on the radiologic and histopathologic features, two variants of LPC have been described: unicystic (solitary); and polycystic (botryoid) types.⁴

The less common polycystic variant of LPC was first described by Weathers and Waldron.⁴ This paper discusses the natural history of a case of polycystic type LPC, and reviews the clinical, radiologic and histologic features of this cyst.

Case History

A 38-year-old Caucasian male presented to the University of Western Ontario dental clinic for complete rehabilitation of his failing dentition. The patient was diagnosed as having advanced dental caries and moderate adult periodontitis. A well-defined, unilocular, radiolucent lesion located between the roots of the mandibular left first and second premolars was also noted. The lesion measured 5.0 mm x 7.0 mm, and exhibited a smooth corticated border. The roots of the adjacent teeth were neither displaced nor resorbed. However, the lamina dura and periodontal ligament space was not clearly discernable where the lesion overlapped the teeth (Fig. 1a). The patient reported no symptomatology related to the area. Vital-

ity tests indicated the teeth were vital. Clinically, there was no evidence of swelling, and the mucosa in the area appeared normal.

The patient was lost to follow-up until 25 months later. A new series of radiographs revealed that the radiolucency had increased in size, and now measured 12 mm x 11 mm. It had also become visibly multilocular (Fig. 1b). Vitality tests of both mandibular left premolars indicated that the teeth remained vital.

The lesion's radiographic features suggested that it was most likely a lateral periodontal cyst. Surgical enucleation of the lesion was performed under general anesthesia. The cystic tissue was submitted for pathological examination, and a diagnosis of "lateral periodontal cyst, polycystic variant" was made. Postsurgical healing was uneventful, and no recurrence of the lesion was evident one year later.

Discussion

Clinical Features

LPCs have been reported in patients over a wide range of ages. Pooled results from several studies found that these cysts occurred in patients between the ages of 20 and 85 years.⁵ Occurrence peaked in the 40 to 69 years age group.^{2,6,7} Wysocki and associates⁸ reported

Table I

Histogenetic Classification Of Central Odontogenic Cysts

A. Cysts derived from rests of Malassez:
1. Radicular (periapical) cyst
2. Residual cyst
B. Cysts derived from reduced enamel epithelium:
1. Dentigerous cyst
C. Cysts derived from dental lamina:
1. Odontogenic keratocyst
2. Lateral periodontal cyst
3. Glandular odontogenic cyst
D. Unclassified odontogenic cysts:
1. Paradental cyst

Table II

Typical Characteristics Of Lateral Periodontal Cysts

Age	Range: 40 to 69 years mean: 50 to 55 years
Gender	Probably slight male predilection
Location	Canine-premolar region of mandible, epicentre of lesion located between cemento-enamel junction and root apices
Symptoms	Usually none
Clinical findings	Usually none — teeth are vital
Radiologic findings	Well-defined, corticated periphery with smooth outline, borders of lesion may appear superimposed over roots, most often unicystic radiolucent contents, occasionally may see a multilocular internal pattern, usually no root resorption or tooth displacement, may see loss of lamina dura and periodontal ligament space

a mean age of occurrence of 50 years, while Rasmusson et al⁹ found it to be 55 years.

The reported gender predilection for LPC varies. Some studies have reported a slight male preponderance,^{3,5,11} while others have reported a definite male predominance.^{8,9} No gender predilection was noted by Eliasson et al⁶ or Cohen et al.¹⁰ Based on all of the reported cases, there appears to be a slight male predilection, however.

LPCs usually occur in the mandibular canine/premolar area.^{5,6,9-11} Only two cases have been reported where the cyst was located distal to the first molars.^{12,13}

Typically, LPCs arise in the inter-radicular bone, but outside

of the periodontium. The associated teeth are vital^{7,8,10,14} and usually asymptomatic,^{3,10,11} but gingival expansion^{3,5,6,10,11} and tenderness to palpation^{3,6,10,11} have been reported. If present, the swelling is dome-shaped, will likely occur on the facial aspect of the gingiva,⁸ and may have a bluish tinge due to tissue distention.^{3,5,10}

Radiologic Features

LPCs are most often detected on routine radiologic dental examination. The cyst presents as a well-circumscribed, corticated radiolucency in close proximity to a lateral root surface, and usually measures less than 10 mm in diameter.^{3,10,15} Most LPCs are located at the middle third of the root,

Table III

Differential Diagnosis Based On Clinical and Radiologic Findings^{3, 7, 10, 12}

Lateral periodontal cyst
Odontogenic keratocyst
Odontogenic myxoma
Glandular odontogenic cyst
Ameloblastoma

but they can be found anywhere between the alveolar crest of bone and the apices of the teeth. Although root resorption is not common, it has been reported.¹⁶

It is unusual for LPCs to displace teeth, but the lamina dura and periodontal ligament space may be lost. The cyst is usually unilocular. As noted in this case report and elsewhere,^{3,10,17,18} however, a multilocular appearance is seen on occasion. The unicystic (solitary) histological variant of the cyst generally has an unilocular radiologic appearance, while the polycystic (botryoid) variant is more likely to have a multilocular appearance.

Progression

As a general rule, LPCs exhibit slow growth. Rasmusson et al⁹ observed a mean growth rate of 0.7 mm per year in four LPCs. Whether these cysts were unicystic, polycystic, or included both types is unknown. The rate of growth observed in this case was 3.4 times higher than the rate reported by Rasmusson et al.⁹ Altini and Shear³ have suggested that the cyst's polycystic variant has the potential to grow larger than the usual LPC. This case supports that view.

Treatment

LPCs are treated by surgical enucleation.^{10,19} Cohen et al¹⁰ reported that healing is usually uneventful, with good bone fill. Recurrence is unlikely, but has been associated with the enucleation of the polycystic (botryoid) variant.¹⁵⁻¹⁷ Two recurrences were reported by Gurol and associates,²⁰ who followed 12 cases of the cyst's botryoid type.

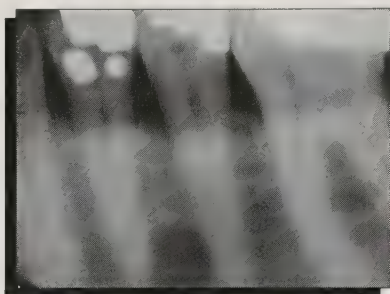


Fig. 1a: Periapical radiograph of an LPC at the time of discovery. Note the characteristic location, shape, internal structure and effect on teeth.

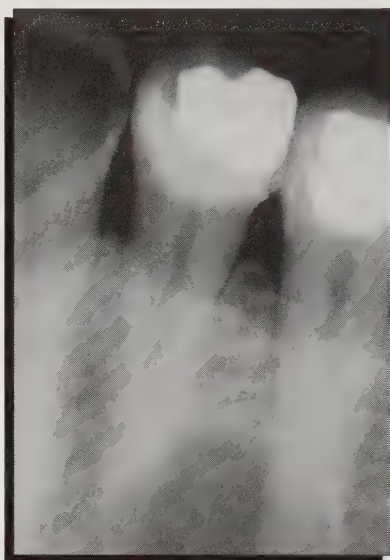


Fig. 1b: Periapical radiograph of the same LPC 25 months later. Note the increase in size and the multilocular pattern at its inferior aspect. Also, note that the teeth have not been resorbed or displaced.

Histologic Features and Pathogenesis

The cystic cavity of an LPC is lined by a characteristic epithelium.^{9-11,21} This epithelium is thin, non-keratinized, and squamous (two to three cells thick). It may also exhibit zones of epithelial thickening, or "plaques" (**Figs. 2a** and **2b**).²²

In some cases, the epithelial lining can consist of a thin layer of cuboidal or low columnar cells.⁸ Although cells with a clear cytoplasm are often distributed throughout this lining, they are most commonly seen within the epithelial plaques. These clear cells have been found to be rich in glycogen.⁸ An artifactual separation of the cyst's epithelial lining from the connective tissue is often seen.^{3,7-9}

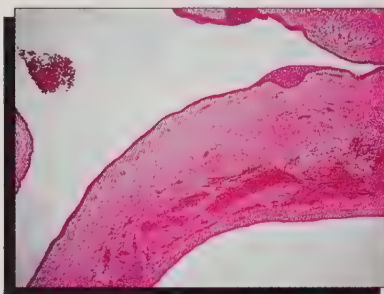


Fig. 2a: Low power photomicrograph of an LPC exhibiting two separate cystic compartments separated by a fibrous septum. H&E. Original magnification: x 10.

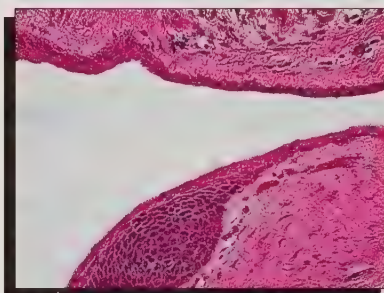


Fig. 2b: Higher magnification of **Fig. 2a** reveals a thin lining of non-keratinized squamous epithelium exhibiting a focal epithelial thickening (plaque). H&E. Original magnification: x 40.

The connective tissue wall of an LPC frequently contains nests of clear cells, which may show evidence of microcyst formation.⁸⁻¹⁰ Some reports suggest that these cells are actually clear cell rests of dental lamina (rests of Serres).^{8,10} A number of other authors have not made this association, however.³ The fibrous wall of an LPC is generally free of inflammation, except in cases when it has become secondarily infected.^{3,7,9,10,23}

There are several important differences between the polycystic and unicystic variants of the cyst. Most notably, the solitary variant is characterized by a single cystic space surrounded by a fibrous capsule, while the polycystic variant has two or more cystic spaces, which are separated by connective tissue septae and surrounded by a fibrous capsule.

It should also be noted that there is no universal agreement on terminology. Altini and Shear³ believe it necessary to further distinguish between polycystic (two or

more cystic cavities within a single round or oval capsule) and botryoid (two or more cystic spaces surrounded by a more irregular and thicker capsule).

Although this case involved the polycystic variant of LPC, it occurs with much less frequency than the unicystic variant. In a study of 37 cases, Cohen et al¹⁰ reported observing six cysts (16 per cent) of the botryoid type. Rasmusson et al⁹ reported that six of the 32 cases they studied (19 per cent) involved this variant.

The pathogenesis of LPCs is not completely understood. Although the cyst's epithelial lining is probably derived from dental lamina,^{7,8} some reports have suggested that it originates from reduced enamel epithelium^{3,7} or from rests of Malassez.^{7,20} Shear and Pindborg⁷ have postulated that LPCs could develop as a dentigerous cyst, which is then displaced to a location along the lateral root surface. They point to the high occurrence of LPCs in locations where dentigerous cysts are more common to support this hypothesis. Interestingly, dentigerous cysts are often associated with unerupted third molars, and LPCs rarely occur in these locations.

The stimulus for epithelial proliferation and LPC development has not been identified. However, it has been suggested that stimulation occurs by way of a genetic influence, as it does in other jaw cysts.³

Differential Diagnosis

The clinical and radiological appearances of LPCs and various other lesions can be similar (**Table III**). Lesions of inflammatory origin must be ruled out when severe periodontal disease²² or a necrotic pulp is present.⁷ In the latter case, the teeth would be nonvital. If the cyst is located in an edentulous area, a residual radicular cyst should also be considered. This lesion can only be positively identified by histologic examination.

Summary

A case of polycystic (botryoid) lateral periodontal cyst is presented. The rate of growth of this lesion and its size support pre-

vious reports, which suggest that the polycystic type of LPC may behave somewhat more aggressively than the unicystic type. ■

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Various other body fluids and tissues were also assayed for clindamycin and the results of these assays and serum levels at the same time are recorded in Table 1.

TABLE I

Specimen	No. of Specimens	Average Serum Level	Average Fluid Level mcg/mL	Tissue Level mcg/g
Pancreatic fluid (C6-264)	4	1.15	45.1	
Bile (C6-264)	19	3.35	52.45	
Gall Bladder (C6- 24)	16	0.81		4.33
Liver (C6-265)	1	42.35		3.80
Kidney (C6-265)	1	1.50		9.07
Bone (C4-390)	2	2.44		9.91

INDICATIONS AND CLINICAL USE

Dalacin C (clindamycin hydrochloride) is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *bacteroides* species, *peptostreptococcus*, anaerobic streptococci, *clostridium* species and microaerophilic streptococci.

Dalacin C is also indicated in serious infections due to sensitive gram-positive organisms (staphylococci, including penicillinase-producing staphylococci, streptococci and pneumococci) when the patient is intolerant of, or the organism resistant to other appropriate antibiotics.

DALACIN C is indicated for prophylaxis against alpha-hemolytic (viridans group) Streptococci before dental, oral and upper respiratory tract surgery.

a) The prophylaxis of bacterial endocarditis in patients allergic to penicillin with any of the following conditions: congenital cardiac malformations, rheumatic and other acquired valvular dysfunction, prosthetic heart valves, previous history of bacterial endocarditis, hypertrophic cardiomyopathy, surgically constructed systemic-pulmonary shunts, mitral valve prolapse with valvular regurgitation or mitral valve prolapse without regurgitation but associated with thickening and/or redundancy of the valve leaflets.

b) Patients taking oral penicillin for prevention or recurrence of rheumatic fever should be given another agent such as clindamycin, for prevention of bacterial endocarditis.

CONTRAINDICATIONS

As with all drugs, the use of Dalacin C (clindamycin hydrochloride) is contraindicated in patients previously found to be hypersensitive to this compound. Although cross-sensitization with Lincocin® (lincomycin hydrochloride) has not been demonstrated, it is recommended that Dalacin C not be used in patients who have demonstrated lincomycin sensitivity.

Until further clinical experience is obtained Dalacin C is not indicated in the newborn (infants below 30 days of age), or in pregnant women.

WARNINGS

Some cases of severe and persistent diarrhea have been reported during or after therapy with Dalacin C (clindamycin hydrochloride). This diarrhea has been occasionally associated with blood and mucus in the stools and has at times resulted in acute colitis. When endoscopy has been performed, some of these cases have shown pseudomembrane formation.

If significant diarrhea occurs during therapy, this drug should be discontinued or, if necessary, continued only with close observation. Significant diarrhea occurring up to several weeks post-therapy should be managed as if antibiotic-associated.

If colitis is suspected, endoscopy is recommended. Mild cases showing minimal mucosal changes may respond to simple drug discontinuance. Moderate to severe cases, including those showing ulceration or pseudomembrane formation should be managed with fluid,

electrolyte, and protein supplementation as indicated. Corticoid retention enemas and systemic corticoids may be of help in persistent cases, anticholinergic and antiperistaltic agents may worsen the condition. Other causes of colitis should be considered.

Studies indicate a toxin(s) produced by *Clostridia* (especially *Clostridium difficile*) may be a principal cause of clindamycin and other antibiotic-associated colitis. These studies also indicate that this toxigenic *Clostridium* is usually sensitive *in vitro* to vancomycin. When 125 mg to 500 mg of vancomycin were administered orally four times a day for 5 - 10 or more days, there was a rapid observed disappearance of the toxin from fecal samples and a coincidental recovery from the diarrhea.

It should be noted that serious relapses have occurred up to one month after apparently successful treatment. A relatively prolonged period of continuing observation is therefore recommended.

PRECAUTIONS

Dalacin C (clindamycin hydrochloride) like any drug, should be prescribed with caution in atopic individuals.

The use of antibiotics occasionally results in overgrowth of non-susceptible organisms – particularly yeasts. Should super-infections occur, appropriate measures should be taken as dictated by the clinical situation.

As with all antibiotics, perform culture and sensitivity studies in conjunction with drug therapy.

Since abnormalities of liver function tests have been noted occasionally in animals and man, periodic liver function tests should be performed during prolonged therapy. Blood counts should also be monitored during extended therapy.

Dalacin C may be used in anuric patients. Since the serum half-life of clindamycin in patients with impaired hepatic function is greater than that found in normal patients, the dose of Dalacin C should be appropriately decreased. Hemodialysis and peritoneal dialysis are not effective means of removing the compound from the blood. Periodic serum levels should be determined in patients with severe hepatic and renal insufficiency.

ADVERSE REACTIONS

Only 65 of the 851 patients treated for infections developed side effects representing 7.6% of the total study group or 8.0% of the 813 patients with follow-up. Only 22 of these patients' symptoms were considered due to Dalacin C (clindamycin hydrochloride) for an incidence of 2.7% among the 813 cases with follow-up.

Gastrointestinal: Abdominal pain occurred in 12 patients for an overall incidence of 1.4% in 851 patients and was considered drug related in 7 (0.8%).

Diarrhea occurred in 22 cases for an overall incidence of 2.6% and was drug related in 13 (1.5%). Vomiting occurred in 14 cases with an overall incidence of 1.6%. Seven patients (0.8%) had nausea which was drug related in 2 cases (0.2%). Side effects were severe in 10 instances. (See also under "WARNINGS"). Esophagitis, at times severe, has been reported.

Hemopoietic: Transient neutropenia (leukopenia) has been reported. Its relationship to therapy is unknown. No irreversible hematologic toxicity has been reported.

Skin and Mucous Membranes: Skin rashes have been reported in 6 patients (0.7%), none of which could be determined as drug related. One case of urticaria was reported but its relationship to drug therapy could not be determined.

Liver: Although no direct relationship of Dalacin C to liver dysfunction has been noted, transient abnormalities in liver function tests (elevations of alkaline phosphatase and serum transaminase) have been observed in a few instances.

SYMPTOMS AND TREATMENT OF OVERDOSAGE

No cases of overdosage have been reported. It would be expected however, that should overdosage occur, gastrointestinal side effects including abdominal pain, nausea, vomiting and diarrhea might be seen. During clinical trials one 3-year old child was given 100 mg/kg of Dalacin C (clindamycin hydrochloride) for five days and showed mild abdominal pain and diarrhea. One 13-year old patient was given 75 mg/kg for five days with no side effects. In both cases laboratory values remained normal.

Overdosage should be treated with simple gastric lavage. No specific antidote is known.

DOSAGE AND ADMINISTRATION

Adults: 150 mg every 6 hours.

Moderately severe infections: 300 mg every 6 hours.

Severe infections: 450 mg every 6 hours.

Children (over one month of age) :

One of the following two dosage ranges should be selected depending on the severity of the infection:

1. 8-16 mg/kg/day (4-8 mg/lb/day) divided into 3 or 4 equal doses.
2. 16-20 mg/kg/day (8-10 mg/lb/day) divided into 3 or 4 equal doses.

Absorption of Dalacin C (clindamycin hydrochloride) is not appreciably modified by ingestion of food and may be taken with meals.

To avoid the possibility of esophageal irritation, Dalacin C capsules should be taken with a full glass of water.

For prevention of endocarditis: Adults: 300 mg orally 1 hour before procedure; then 150 mg 6 hours after initial dose. **Children:** 10 mg/kg (not to exceed adult dose) orally 1 hour before procedure; then 5 mg/kg 6 hours after initial dose.

Note: With β -hemolytic streptococcal infections, treatment should continue for at least 10 days to diminish the likelihood of subsequent rheumatic fever or glomerulonephritis.

AVAILABILITY OF DOSAGE FORMS

Each capsule contains clindamycin hydrochloride hydrate equivalent to 150 mg or 300 mg clindamycin base. Supplied in bottles of 100 and 500 capsules.

Further product information available on request. 17/08/95

References :

1. Sanford JP et al. The Sanford: Guide to Antimicrobial Therapy (26th ed.) 1996
2. Zambrano et al. Clindamycin in the Treatment of Human Infections 1992. 10 1-24
3. Penicillin Product Monograph: CPS, 32th edition, 1997, CPh A.

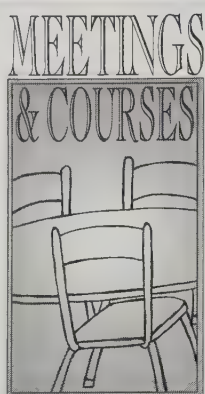


Pharmacia
&Upjohn

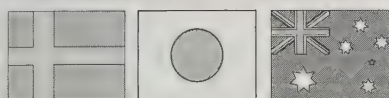
Ontario, Canada

9704 Registered Trademark: Dalacin CE1654.1

PAAB



INTERNATIONAL



February 6-14

8th Annual Caribbean Winter Seminar of the Pennsylvania Academy of General Dentistry in Barbados. Contact Dr. Tom Howley. Tel.: (215) 699-8751; fax: (215) 699-5618; e-mail: TAHOWLEY@aol.com

February 14-21

Barbados Dental Convention. Contact Ms. Lynne Brandon. Tel.: (519) 657-4306 (evenings); fax: (519) 472-9120; e-mail: rbrandon@julian.uwo.ca. Or contact Mr. Jerry Sheppard. Tel.: (519) 434-1647 (days); fax: (519) 434-4936.

February 16-20

10th Annual Mid-Winter Meeting of the Barbados Dental Association in Christ Church. Contact Ms. Kathleen Beckles, administrative officer, or Dr. T.E.H. Talma, convention chairman, 17 Pines Rd., Belleville, St. Michael, Barbados. Tel./Fax: (246) 436-6103.

February 22-27

Virgin Islands Dental Convention. Contact Ms. Lynne Brandon. Tel.: (519) 657-4306 (evenings); fax: (519) 472-9120; e-mail: rbrandon@julian.uwo.ca. Or contact Mr. Jerry Sheppard. Tel.: (519) 434-1647 (days); fax: (519) 434-4936.

March 7-14

14^e Forum de l'Association Internationale Francophone pour la Formation continue en odontologie (AIFCO) in Val d'Isère,

France with the collaboration of the Faculté de médecine dentaire, Université Laval, Québec. Contact: Dr. Christian Bernard, Faculté de médecine dentaire, Université Laval, QC. Tel.: (418) 656-5018; fax: (418) 656-2720; e-mail: Ruth.Turcotte@fmd.ulaval.ca

March 21-28

41st International Alpine Dental Conference in Courchevel 1850, France. Contact the International Dental Foundation, 53 Sloane Street, London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; fax: 44 (0) 171 235-0767.

March 29 - April 3

4th Endodontic World Congress in Jerusalem, Israel. Contact Dr. Adam Stabholz or Dr. Don Arens, IFEA Secretariat, Fourth Endodontic World Congress, P.O. Box 50006, Tel Aviv 61500, Israel. Tel.: 972 (3) 5140000; fax: 972 (3) 5175674/5140077.

April 23-25

1998 British Dental Association National Dental Conference in Harrogate, England. Contact Ms. Charlotte Long or Ms. Katherine Fort, Conference Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855; e-mail: conference@bda-dentistry.org.uk

June 25-27

5th Dental International Congress of the Turkish Dental Association in Bursa, Turkey. Contact Chamber of Dentists of Bursa, Altiparmak Cad. Petek Ish.K.4, Bursa, Turkey. Tel.: 90 (0) 224-222-69-69; fax: 90 (0) 224-223-53-59.

July 2-4

1st Chinese International Conference on Comprehensive Orthodontics in Nanjing, China. Contact Javisa International Ltd., 425 University Ave., Suite 301, Toronto, ON M5G 1T6. Tel. (collect): (416) 595-9877; fax: (416) 595-9565.

September 8-11

135th British Pharmaceutical Conference in Eastbourne, England. Contact BPC Secretariat, Royal Pharmaceutical Society of Great Britain, 1 Lambeth High St., London SE1 7JN, U.K. Tel.: 44 (0) 171 820-3241; fax: 44 (0) 171 735-7629.

October 1-3

3rd International Congress On Dental Law and Ethics in London, England. Contact Congress Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855.

October 15-17

Microscope & Future — Multidisciplinary Symposium On the Use Of Microscopic Dentistry in Rome, Italy. Contact Mrs. Paola Mercaldo, G&G Congressi, 00143 ROMA, Via Tommaso Arcidiacono, 87, Italy. Tel.: 39 (06) 5043441 - 5043442; fax: 39 (06) 5033071.

CANADA



February 20-21

The Use Of Automated Handpieces and Nickel Titanium Instruments In Endodontics in Winnipeg, Man. Presenters: Drs. Carl E. Hawrish and William Christie. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

March 18-21

30th Annual Western Canada Dental Society Curling Bonspiel and Seminar in Regina, Sask. Contact Dr. Dale Graham. Tel.: (306) 359-3945; fax: (306) 565-3260.

March 21

Advances In Preventive and Restorative Materials in Winnipeg, Man. Presenter: Dr. Kenneth J. Anusavice. Contact Ms.

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No. 1



Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

April 18

Designing the Esthetic Occlusion and Cultivating Natural Esthetics in Winnipeg, Man. Presenter: Dr. Lloyd L. Miller. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

May 7

25th Reunion Dinner and Dance, University of Toronto Class of 1973 on Toronto Island, Ont. Contact Dr. Helen Johnston. Tel.: (416) 924-4695.

May 30

Contemporary Restorative Materials and Cosmetic Dentistry in Winnipeg, Man. Presenter: Dr. Charles W. Wakefield. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

July 30 - August 1

Aesthetics '98 — International Symposium on Excellence in General Practice and Aesthetic Dentistry in Whistler, B.C. Contact Ms. Debbie Larocque, McGill University. Tel.: (514) 398-7203, ext. 4165; fax: (514) 398-8900. Or contact Ms. Olga Chodan. Tel.: (514) 398-7221.

U.S.A.



March 5-7

13th Annual Meeting of the Academy of Osseointegration in Atlanta, Ga. Contact Academy of Osseointegration, 401 N. Michigan Ave., Chicago, IL 60611-4267. Tel.: 1-800-656-7736 or (312) 321-5169; fax: 1-800-416-7736 or (312) 245-1080; e-mail: academy@osseointegration.org

April 24-27

Star of the North Meeting in Saint Paul, Minn. Contact Ms. Dianne (Lutkevich) Blake, Minnesota Dental Association, 2236 Marshall Ave., Saint Paul, MN 55104. Tel.: (612) 646-7454.

August 5-8

23rd American Academy of Esthetic Dentistry Annual Meeting: The Pursuit of Esthetic Excellence in Philadelphia, Pa. Contact AAED Headquarters, 1807 S. Washington St., Suite 106, Naperville, IL 60565. Tel.: (630) 355-0424; fax: (630) 355-0474.

DENTAL MEETINGS



March 12-14

Pacific Dental Conference in Vancouver, B.C. Contact Ms. Marilynne Webster. Tel.: (604) 736-3645.

March 27-28

CDA Board of Governors Interim Meeting in Ottawa, Ont. Contact Ms. Suzanne Burton. Tel.: (613) 523-1770, ext. 201, or 1-800-267-6354.

May 7-9

ODA/CDA National Convention in Toronto, Ont. Contact Ms. Patricia Brennan. Tel.: (613) 523-1770, ext. 246, or 1-800-267-6354; fax: (613) 523-3062.

May 23-27

27^e Congrès annuel de l'Ordre des dentistes du Québec in Montréal, Que. Contact Dr. Denis Forest. Tel.: (514) 875-8511; fax: (514) 875-1561.

May 29-30

New Brunswick Dental Society Annual Meeting in St. Andrews, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; fax (506) 452-1872.

June 4-6

Prince Edward Island Dental Association Annual Meeting in Woodstock. Contact Ms. Nettie Likely. Tel.: (902) 566-5199; fax: (902) 892-4470.

June 8-14

92nd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. Barry Fleming. Tel.: (403) 346-8443; fax (403) 342-2665.

June 12-13

Nova Scotia Dental Association Annual Meeting in Yarmouth, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; fax: (902) 423-6537.

June 18-20

Newfoundland Dental Association Annual Meeting in St. John's, Nfld. Contact Dr. Gary Butler. Tel.: (709) 368-1431; fax (709) 364-1770.

June 18-20

Annual Scientific Session of the College of Dental Surgeons of Saskatchewan in Saskatoon, Sask. Contact Dr. Damara Rayner. Tel.: (306) 978-1700.

Notices of meetings and continuing education courses are published without charge for appropriate **not-for-profit** dental organizations, teaching facilities or recognized study clubs. Information must be received two months prior to the expected publication date, and will be published at the discretion of the editor. Send all requests c/o Ms. Rachel Galipeau, *Journal* editorial assistant, Canadian Dental Association, 1815 Alta Vista Dr., Ottawa, ON K1G 3Y6.

"I feel so thirsty."

Extreme thirst *can* be one of the warning signs of diabetes. Are you thirsty all the time? If so, don't ignore it. Please see your doctor.

For more information about diabetes, contact the Canadian Diabetes Association.

So much can be done.

THE
Diabetes
CAMPAIGN



CANADIAN
DIABETES
ASSOCIATION

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DU DIABÈTE



Most events at the ODA-CDA 1998 Convention take place from May 7th to 9th, but there are activities on May 10th, including a Mother's Day Brunch.

Be sure to check your mail in January for the Preliminary Program.

Convention Benefits

We are inviting both general and specialized practitioners to attend the Convention, as the scientific program is composed from a wide range of lectures. The lectures examine the latest in scientific developments while maintaining a focus on the fundamentals of dentistry and the practical implications for your office.

Hands-on Courses and Workshops encourage in-depth learning in small groups on specific areas of concentration. Our lecturers come from Canada, the United States and international destinations. They are widely recognized in their field, chosen to bring a wealth of knowledge and expertise to convention participants.



The ODA-CDA 1998 Convention is designed to be a beneficial experience for all participants. For many, it is an opportunity to fulfill continuing education requirements. The scientific program has been designed to include a wide variety of topics for each dental team member.

The Convention is also a time to meet new colleagues from across Canada, to reacquaint with classmates or renew distant relationships. Participants interested in organizing Class Reunions, Study Club Reunions or any type of get-together should contact the CDA Convention department at (613) 523-1770 ext. 246 or fax their request to (613) 523-3062.

Participants also find this is a great time to concentrate on office needs by examining what's new in the Exhibit Hall.

Lastly, participants may obtain a proof of attendance certificate at the registration area — a memento of their 1998 convention experience.

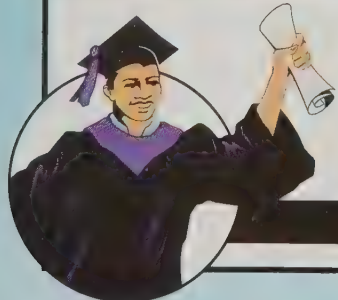
Keynote Speaker



Shirley Roberts

Our world is being transformed at a gale-force pace. Futurists tell us of even greater changes to come. These changes have had, and will continue to have a dramatic impact on consumers and on their spending habits.

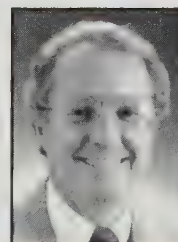
Find out what the leading and responsive drivers of consumer spending are. Learn how changes in these drivers will impact consumers in the new millennium. They will be challenged to think differently about their business. Capitalize on emerging trends by using the marketing strategies Shirley proposes.



New Dentists Program

This year's half-day program will feature, Mr. Doug Young, a prominent speaker in the area of practice management, including financial planning, human resources management and the legal issues surrounding the set-up of a new practice.

Co-sponsored by CDA & CDSPI



Hands-on Courses

An integral part of the Continuing Education portion of the Convention are the hands-on courses. The following sessions will be offered throughout the Convention.

ESTHETICS



Paul Belvedere

DDS, FASDA, FACD
Professor, Post-Graduate
Program, Esthetic Dentistry,
Baylor College and State University
at Buffalo, New York
Edina, Minnesota

Expanding the General Dental Practice with Non-Metallic Techniques Through Progressive Composite Dentistry

A multimedia presentation, slides and closed circuit TV demonstration, teaching practical, time-saving, techniques which will be used the next working day for every participant. You will leave with a higher degree of confidence in their use of composite resins, reduced chair-time techniques, and with expanded treatment modalities which will increase their practices.

Participants must have completed this course to attend the following session.

High Quality, Composite Dentistry for the Practical Dentist

The goal of the hands-on course is to give the doctors a first-hand tactile experience in placing matrices in different restorative situations, and restoring the prepared teeth with the advanced techniques that have proved successful in Dr. Belvedere's practice.

Dr. Belvedere has been demonstrating and teaching the control of polymerization shrinkage by bulk placement of the composite in all direct composite techniques since 1985. The clinical success of his methods is now being recognized by leading researchers in dental materials.

Dr. Belvedere encourages doctors to bring their staff members and to ask questions during the day as efficiency increases with team effort. This seminar will give the participants practical information that they will make use of the very next practicing day. His techniques are being used and praised here and abroad.

ENDODONTICS

Salam Sakkal

DMD, MS
Associate Professor, Department
of Restorative Dentistry
Université de Montréal
Assistant Dean for
Continuing Education

Advanced Concepts in Endodontics

This hands-on workshop will review many new and advanced techniques in endodontics in order to improve your skills and allow you to implement these most recent concepts within your practice immediately and perform endodontics with better control, ease and satisfaction.

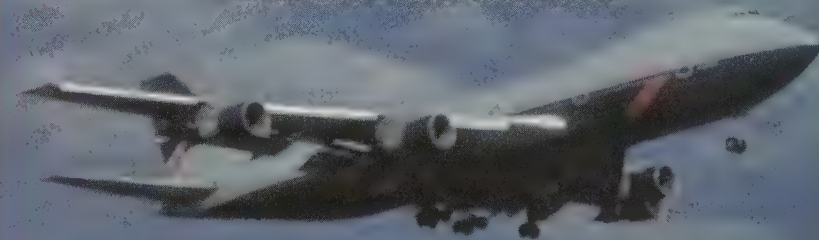
Airline Information

This year, Convention participants who fly CANADIAN AIRLINES will be eligible for a draw! This draw will be for two economy class return tickets good for travel on any CANADIAN AIRLINES serviced destination in North America (some restrictions apply).

To enter, you will be required to drop your CANADIAN AIRLINES boarding pass with your name on it in the ballot box — so don't discard your boarding pass! (Acceptable boarding passes will be only from Convention participants who flew CANADIAN AIRLINES to attend the ODA - CDA 1998 Convention.)

CANADIAN AIRLINES is the official carrier of the 1998 ODA - CDA Convention in Toronto. CANADIAN AIRLINES is pleased to participate in our meeting and is offering special convention rates for those attending the event, including a 5% additional discount on excursion rates.

**When booking your flight, mention the code 01850
to obtain convention rates.**



Book your tickets using the above number to save money,
and frequent flyer points to your card and be eligible for the draw.

**For reservations and information, call CANADIAN AIRLINES
directly at 1-800-665-5554 or have your travel agent call.**

Hands-on Courses

All hands-on courses will be held at the Toronto Convention Centre.

Participants wishing to attend a hands-on course must pre-register for these courses clearly indicating their selection(s) on the registration form.

These sessions have limited enrolment, therefore, participants are encouraged to register early to avoid disappointment. Registration in these courses is on a first-come, first-served basis.

HIGH TECHNOLOGY PRACTICE



John H. Jameson

DDS
Jameson Management
Group
Davis, Oklahoma

High-Tech Dentistry: Its Integration into the 21st Century Practice Today (Part I)

This half day "hands-on" demonstration session offers the attendees an opportunity to work with a variety of high-tech diagnostic and educational equipment available on the market today. Trained technicians will be available from the various companies to provide assistance for the attendees with their exposure to the technology.

Each participant will be provided opportunity to work on a variety of equipment, to capture images and save them digitally for future use. Manipulation of images will be demonstrated and practiced so that the participant will understand how to manage these images in the new patient and consultation experience.

High-Tech Dentistry: Its Integration into the 21st Century Practice Today (Part II)

The rapidly expanding field of diagnostic and patient education technology is an area of dentistry that is most on the minds of clinicians internationally. The questions from practitioners not only are concerning the equipment available but its incorporation into the practice. This incorporating is the area least understood by practices that are attempting to increase clinical efficiency and generate a profit. Dr. Jameson will help lead the dentist and the entire team to a new level of understanding previously not accomplished by many practices.

This seminar is a must for dental practices trying to stay on the "cutting edge".

PERIODONTICS



James Grisdale

BA, DDS, Dip.Prosth.,
Dip.Perio, MRCD (C)
Lecturer and clinical researcher in
Continuing Dental Education
University of British Columbia,
Vancouver, B.C.

Hand and Powered Periodontal Instrumentation

Successful management of the periodontal patient begins and ends with control of the root surface environment. The most difficult and critical modality or therapy in dentistry is scaling and root planing. This program addresses that issue with the most current techniques and instruments to achieve a root surface compatible with biologic health. The participant will become familiar with the new generation of hand instruments and ultrasonic systems. The hands-on portion of the program covers the in-depth use of ultrasonic instrumentation and an opportunity to utilize the latest in piezoelectric instrumentation on a typodont.

Harinder S. Sandhu

BDS, PhD, Dip in Perio
Associate Professor
and Chairman
Division of Periodontics
University of Western Ontario
London, Ontario

Clinical Periodontal Surgery

Surgical Therapy is an integral part of comprehensive periodontal treatment. Pocket reduction remains the ultimate goal of non-surgical treatment modalities. The development of newer plastic surgical procedures have taken the field of periodontal surgery to new horizons. This course will discuss the rationale behind the various treatment modalities and the participants will perform some surgical procedures on pig jaws during this hands-on course.

Pre-registration Incentive Draws!

Register before **April 3rd, 1998** and become eligible for great cash prizes and draws! You could win a trip for two or a car or ... Read all about it in your *Preliminary Program* coming to you in January.



Hands-on Courses

RESTORATIVE



George Freedman

DDS, FAACD

Director of Post-graduate Programs in Esthetic Dentistry at State University of New York at Buffalo, the University of Minnesota (Minneapolis), the University of Missouri (Kansas City) and at the

Eastman Dental Center, University of Rochester, New York.

Tooth Whitening: Hands-on the Future

The whitening of teeth is the most popular treatment in dentistry today. Numerous techniques and materials are available to the practitioner. This hands-on program is designed to familiarize the dentist with the latest in treatment modalities and the most effective de-staining materials.

Both in-office and at-home techniques are demonstrated. Each participant fabricates a whitening stent and has an opportunity to assess an array of whitening products.

The topics covered include: Safety of tooth whitening, marketing this procedure in everyday practice, treatment documentation, and tooth whitening prior to veneer treatment.

The workshop provides information which can be put to use immediately by dentists and their staffs.

Impressions to Provisionals

New materials and techniques in impression materials (such as automixing syringes) have simplified the process of replicating the prepared tooth. The improved chemistries of the impression material allow for more accurate, faster impressions in a moist environment.

In this hands-on course, the following techniques demonstrated are: automixing impression, (wash and tray) materials, fast-set impression materials, and a simplified triple-tray technique.

Provisional restorations have long been necessary nuisances to the dental profession. Even the name "temporaries" denoted the transient and unimportant nature of these procedures. Recent advances in clinical provisionals, however, include better chemistries, easier manipulation and the ability to correct and repair the provisional. The following techniques are demonstrated: single crown provisionals, bridge provisionals, inlay-onlay provisionals, and provisional characterization.



**GET
READY
TO**

BOOGIE

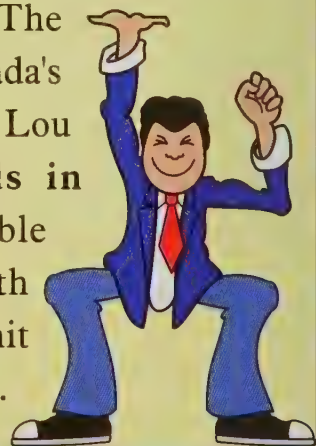
WITH

**LOU NELSON &
THE RENO SHOW!**

VIVA LAS VEGAS!

Come and live the experience on May 7th!

An exciting, high energy show featuring such hits as Y.M.C.A., September, Celebration, Get Down Tonight, Disco Inferno, Boogie Wonderland and many more favourites bring back the fever of Disco music. Lou Nelson and the Reno Show take you out on the town with the greatest hits of the era. Two female and two male vocalists will dazzle you with their voices and will make you believe ABBA is performing for you. The show's feature performer, Canada's top Tom Jones impersonator, Lou Nelson, from the 'Legends in Concert', tops off an incredible evening of entertainment, with the Reno Show Band and their hit parade from the 60's to the 90's.



General Lectures

The general scientific lectures of the Convention proper are open to all who are registered for the Convention. Lectures listed here are a preliminary listing and may be subject to change.

YOSEF NAHMIAS, DDS, M.Sc.
Oakville, Ontario
Predictable Endodontics with the Use of New Technologies

WILLIAM DORFMAN, DDS
Los Angeles, CA
Building the Ultimate Esthetic Dental Practice

BRIAN COSTELLO
Toronto, Ontario
Taking Care of Your Money

HUGH DOHERTY, DDS, CFP
Use it or Lose It – Making the Most of Your Money

CAROL-LEE HEFFERNAN
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The TMD Controversies

Burton H. Goldstein, DMD, MS

Scientifically based dental practice requires practitioners to continuously update — and implement — their knowledge. Adopting fixed patterns of practice, or delaying the transfer of knowledge from science to clinical practice can have undesirable, if not harmful, effects on patients and social systems.

The controversy surrounding the common facial pain condition known as temporomandibular disorders (TMD) provides a case in point. A wide variety of procedures, and all too frequently what may be considered a no-holds-barred approach, are used to treat this disorder.

We now know that TMD represents a variety of musculoskeletal conditions, which are primarily non-structural and rarely related to the dentition. In addition, we know that the occurrence of TMD may be associated with motor vehicle accidents, and that this often leads to litigation and third-party reimbursement for dental services. Unfortunately, we also know that it creates an opportunity for dentists to take advantage of the patient and the system by providing services that, although they have been justified under the guise of latitude in a controversial field, are clearly based on scientifically disproved and discredited concepts.

A certain amount of latitude is appropriate in the clinical manage-

ment of any individual patient. At the same time, however, treatment modalities must conform to known and accepted standards of practice and science. Both the College of Dental Surgeons of British Columbia and The Royal College of Dental Surgeons of Ontario recently issued clinical practice guidelines on TMD. In the United States, the National Institutes of Health have published a Technology Assessment Statement on the Management of TMD. The wording of the statement and guidelines clearly reflects the important movement away from irreversible dental procedures.

Today, the leading sources of controversy regarding TMD include: nomenclature; diagnostic classifications; diagnostic testing; proven treatments; the present understanding of related pathophysiology; chronic pain; and neurobiology; all of which are compounded by a diverse and inconsistent scientific literature.

Dental science is becoming increasingly stringent with its criteria for acceptable research and science. However, the dental literature, like the literature of all other science-based professions, offers a wide range of constantly changing and improving information. When controversy develops, the need for standards of practice becomes evident. In response, the profession's authoritative bodies attempt to

clarify the issues, as well as lay the groundwork for eliminating the controversy by proposing accepted scientific practices.

Although our present terminology (TMD) may be imperfect, it is clearly more appropriate than the misleading "TMJ." It also better reflects the present understanding of a variety of conditions, most of which are minor and self-limiting, and do not require invasive treatment.

A very small number of TMDs are associated with correctable structural abnormalities that cause pain and dysfunction. These conditions require precise diagnosis, and may benefit from irreversible treatment. However, the vast majority of TMDs are not associated with correctable structural conditions, and large numbers of TMD cases are chronic in nature.

One interesting phenomenon of dental treatment for TMD is that it usually relates more to the practitioner, and his or her field of expertise, than to the patient. Prosthodontists and restorative dentists tend to perform occlusal restorative procedures, orthodontists perform orthodontic procedures, and oral and maxillofacial surgeons perform surgery. This occurs even though the vast majority of all TMD cases get better without treatment, and the long-term prognosis is usually good unless iatrogenic problems intercede.

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The concept of occlusal-related TMD is not supported by sound science, and we know that malocclusion is not an important factor in TMD. Today's expert scientific consensus is that irreversible treatments (restorative, orthodontic, or surgical) are inappropriate in the initial management of TMD. If they are recommended, great care and fully informed patient consent are definite requirements.

Similarly, sophisticated and expensive imaging techniques, such as magnetic resonance imaging (MRI) are infrequently useful, and usually have no effect on therapy. Their main purpose is to confirm the undisputed gold standard of TMD diagnosis, the patient history and physical examination. The use of advanced dental diagnostics such as mounted study models, jaw motion tracking, surface EMG, thermography and sonography, also has little or no scientific validity in the diagnosis of TMD.

Recent scientific evidence has led to a significant shift away from dental/structural concepts in favor of medical/management in TMD cases. Experience has shown that dental procedures are often more harmful than beneficial in the treatment of TMD. Unfortunately, dentists are not trained to manage chronic diseases. We usually treat structural problems, in the expectation that they will be cured and no longer remain problematic. As a result, we have retrospectively determined that a number of well-intentioned, standard of care treatments in TMD were inappropriate and harmful, including the infamous Vitek TMJ implants.

Unfortunately, we are now seeing the harmful results of other, even less justifiable TMD treatments, such as altered jaw positioning, occlusal rehabilitation, orthodontics, and orthognathic surgery. The known complications of these treatments may magnify, worsen, and prolong the course of TMD.

We currently understand that most TMD results from neurobiological, psychological, and social processes with musculoskeletal symptoms and findings. In this respect, it is not unlike muscle ten-

sion headache, chronic low back pain, and fibromyalgia with non-structural muscle/joint pain. Furthermore, we now realize that the majority of temporomandibular joint derangements do not cause significant pain or dysfunction.

Although deficiencies in the scientific and clinical knowledge of TMD exist in all areas, this in no way justifies the use of discredited, outmoded, disproved, or unproven treatments. In our litigious society, dentists are accountable and responsible for their actions. We must be prudent and up to date, or we risk seeing a quick financial gain lead to a long-term problem.

The present standard of care in TMD requires an accurate multifactorial diagnosis of structures, functions, behaviors and their interrelationships, as well as pain. Proper care often involves less physical treatment and more management with multiple modalities, including patient counselling and education. This is the primary responsibility of the managing practitioner, however, a coordinated team of practitioners using multiple appropriate therapies is known to be more beneficial than a single treatment modality.

Communication skills and the ability to deal with long-term problems are supplementing dental procedures in the treatment of TMD. The management of TMD should not be a function of the practitioner's dental specialty, but rather of his or her knowledge, skill, ability, and preference. Making logical, science-based management decisions based on accurate diagnosis, and above all doing no harm, is the appropriate standard of care in the treatment of TMD. ■

Dr. Burton H. Goldstein is a clinical associate professor, faculty of dentistry, University of British Columbia. He is a certified specialist in oral and maxillofacial surgery and in oral medicine, and maintains a private practice in Vancouver, B.C.

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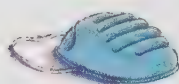
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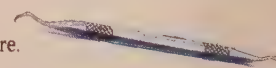
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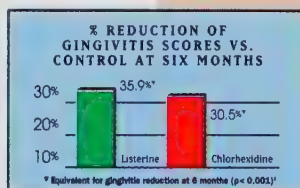
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[‡] Gingivitis was evaluated using the Modified Gingival Index. ^{*}TM Warner-Lambert Company Warner-Wellcome Inc. use Scarborough, Ontario M1L 2N3.

¹ Overholser CD et al. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. *J Clin Periodontol* 1990;17:575-579. [PAAB]

² DePaola LG, et al. Chemotherapeutic inhibition of supragingival dental plaque and gingivitis development. *J Clin Periodontol* 1989;16:311-315.

³ Data on file, 1995

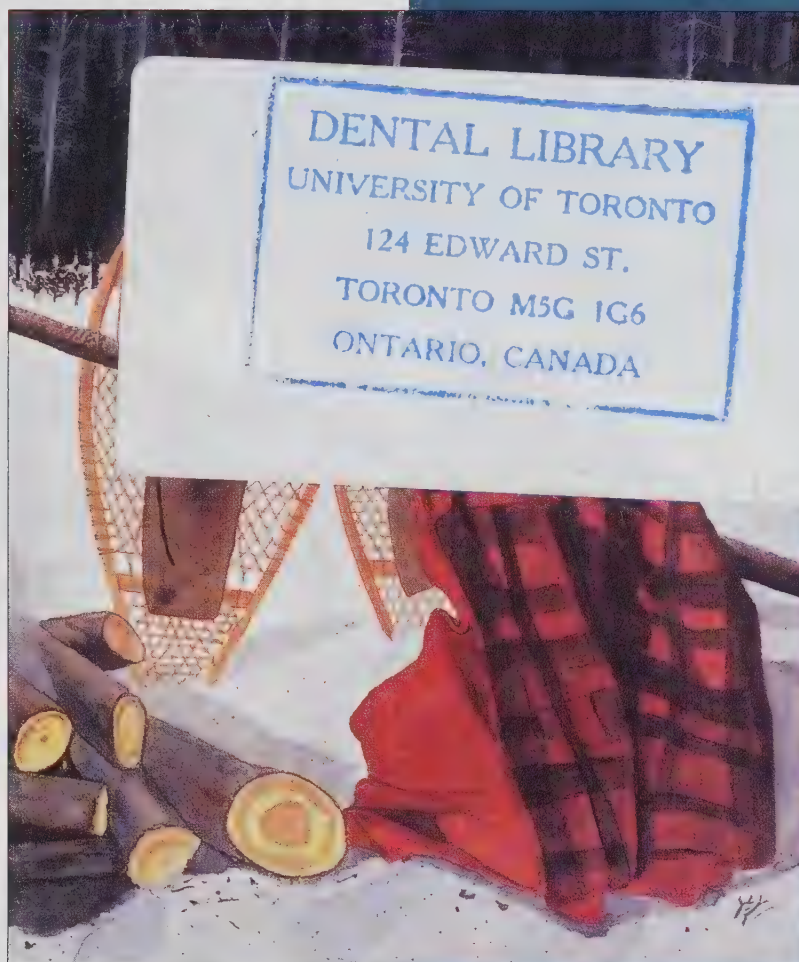
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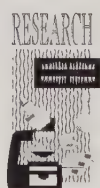


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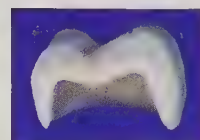


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EDITORIAL

HEALTH PROFESSION OR BEAUTY BUSINESS: WHAT DIRECTION IS DENTISTRY TAKING?



Dr. John P. O'Keefe

One of my most sobering conversations in recent years was with a member of a provincial dental licensing body. This dentist, very concerned about the long-term health of our profession, felt that patients should adopt the maxim of "buyer beware" when they visit their dentist. This belief shocked and saddened me.

In theory, at least, the maxim "buyer beware" should not apply to the services provided by health care professionals in the same way it does to the goods and services available in the regular marketplace.

The consumer of goods and services is assumed to be sovereign when buying a tube of toothpaste, a haircut or a vacation. However, the consumer of a dental or medical service cannot be assumed to have a sufficient level of knowledge to be classified as sovereign. Most economists agree that the market for medical and dental services is not like the regular market, precisely because of the knowledge disparity between the provider and recipient of care. Our patients trust that we will act in their best interests by delivering a high quality service. Furthermore, society entrusts the dental profession as a whole with the privilege of self-regulation, based on the assumptions that our body of professional knowledge is so complicated that it can only be understood by us, and that we as individuals will not exploit vulnerable patients.

Knowledge is power. The dentist is in a position of power in the individual dentist-patient relationship.

What concerns me, based on what I've read in the dental literature lately, is that dentists are being encouraged by certain authors to adopt very forceful tactics in presenting treatment options to patients, particularly when it comes to cosmetic dentistry. I have a great disquiet with dentists being advised — under the guise of "good communication skills" — to promote cosmetic dentistry through heavy-handed selling techniques.

Good communication is built on listening to your patients, not presenting selective information in an unfair fashion.

A recent article, titled "Gateways to patient acceptance of cosmetic procedures,"¹ describes a technique for "getting to a yes" that crosses the line of indecency, and certainly does no credit to our profession. The technique, called chairside esthetic mock-up, is described as "one of the most dramatic and effective ways to present certain cosmetic services." And dramatic it certainly is.

During a routine appointment, suggests the author, tell your patient that you would like to demonstrate "something very interesting that takes just a few moments." If the patient agrees, place some composite on the patient's unetched front teeth to show what can be done to treat a diastema, peg lateral, or a rotated tooth, for example.

The author admits that the patient, who did not ask for this demonstration, will be moderately interested in the cosmetic procedure at this stage. But two more dramatic steps are crucial for completing the sale.

Excuse yourself from the room for a few moments, leaving the patient to contemplate their potential smile in a hand mirror. When you return, remove the composite mock-ups one by one with the patient watching in the hand mirror. According to the author, the reaction of the patient will be incredible as she or he "sees the disappearance of their brand new smile."

I find it interesting that the author perceives this technique to be a low pressure sales approach that does not take much in the way of salesmanship.

I appreciate good drama. I marvel at entrepreneurship and human creativity. I recognize that cosmetic procedures have (and always have had) an important place in dental practice. However, dramatic games aimed at selling cosmetic dentistry are distasteful to me and don't sit comfortably with my concept of a profession.

Perhaps my concept of a profession (a paradigm from the last century) is outmoded, or maybe we need to rethink what kind of profession dentistry really is. What I hear and read these days is that "dentists are competing for the discretionary income of consumers." We're being told that "if consumers can afford fur coats and 4 by 4 vehicles, then they can surely afford the best that dentistry has to offer." This type of discourse is pushing dentistry in a new direction.

Do we really want to go in this direction? Dental practice has always been a balancing act because we provide an ethical health service in an entrepreneurial environment. Formerly, we happily placed the emphasis on ethical action, now more voices call unashamedly for dentistry to be more businesslike. I think this change of emphasis is fundamental, and will have major consequences for our profession.

I invite you to express your views on this issue in a letter to the editor or an opinion piece. Ideally, I'd like to create a forum in this *Journal* for dentists to debate the major issues facing our profession. Let's talk.

John O'Keefe
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Reference

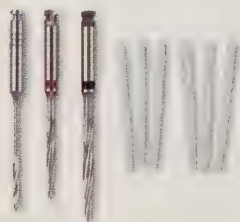
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Journal

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No. 2

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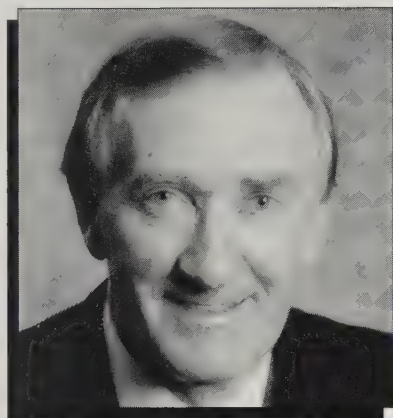
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PRESIDENT'S COLUMN

CE SPELLS QUALITY DENTISTRY



Dr. Toby Gushue

Dentistry in North America has become a multibillion dollar industry that encompasses everything from the actual delivery of oral health care and the manufacture of dental instruments, to the design and administration of dental plans.

Although dentists and the dental manufacturing industry have had to draw in their belts a notch in recent years, one segment of dentistry is virtually booming — continuing education (CE).

There are several reasons for this trend, including the lower demand for dental services in major Canadian cities (relative to the supply of dentists ready to supply these services), and dentistry's increased focus on practice management.

As dentists, we have a responsibility to our patients and our profession to be continuous learners. Dentistry's licensing authorities have made CE mandatory — a concept that I fully support — to ensure that we fulfil this obligation.

Prior to the introduction of mandatory CE, many dentists were doing little or nothing to advance their knowledge of dentistry beyond what they learned in dental school. Now that CE has become a requirement of licensure, however, both participation in CE and the number of available courses have increased dramatically.

Just a few years ago, most Canadian CE courses were offered by our dental faculties and dental associations. Today, our office mail nearly always includes at least one brochure promoting a new CE course. A multiplicity of organizations — from dental laboratories to self-proclaimed institutions of "advanced" dental education — have jumped on the CE bandwagon.

Canadian dentists are travelling widely to attend these courses — and meet the requirements for continuing education in their province. Unfortunately, while the accreditation process ensures that Canada's dental programs are meeting expectations, the educational value of many CE courses is open to question.

This creates a dilemma. If dentists are required to meet certain standards to obtain their license, should they not also be required to meet certain standards — through continuing education — to maintain their license? But how can we determine if they are actually doing so? What standards should dentists be required to meet through CE to maintain their licence? How can we assess the content and quality of the CE courses being offered to dentists? How can we monitor the qualifications of the individuals presenting CE courses? What are the licensing authorities doing to ensure that CE courses have value for dentists beyond simply obtaining CE credits?

I have sat through enough CE courses to know that some of them have very little substance. We cannot assume that a CE course is valuable simply because the presenter has circulated a flashy brochure, given him or herself a grandiose title, found a sponsoring organization, and promised to show a couple of slide carousels of successful clinical cases.

One solution would be for the licensing bodies to set stricter continuing education standards for dentists, by requiring them to attend courses approved by the Continuing Education Recognition Program (CERP).

Established by the American Dental Association (ADA), CERP

evaluates CE courses in the U.S. and Canada, as well as the organizations and individuals that provide them. To gain approval, CE courses must meet 14 quality standards and CE providers must comply with CERP's standards and criteria. CDA entered into a partnership agreement with ADA in 1997 to ensure that Canadian CE courses are included in the CERP evaluation and approval process, and a CDA representative serves on the CERP committee.

CERP is not the only answer, however. Although more dentists are participating in continuing education, the concept of continuous learning is still poorly understood. Rather than realizing that the CE required to maintain our license is the bare minimum we need to continue providing a high standard of care to our patients, many dentists complain about lost practise time. Others say the rules should be softened to allow CE credits above the minimum annual requirement to be carried over to the following year.

Is there such a thing as excess learning? One dentist I know achieved the minimum number of CE hours required to maintain his license several months before the deadline. Although he was interested in a number of other courses, he didn't attend them because he would not get any CE credits for doing so.

This dentist doesn't seem to realize that, by not attending a course that could have provided him with new knowledge and skills, he has betrayed both his patients and his profession. His interest in CE revolves around his license, and not his professional obligations to his patients.

While mandatory CE has been a fact of life in Western Canada for about 25 years, it is a relatively new concept in the rest of the country. CE is still not mandatory in Quebec. Despite its growing pains, however, CE is here to stay, and we dentists should use it willingly to fulfil our obligation to provide the highest possible standard of care to our patients.

*Toby Gushue, BA (Ed.), BA, DDS
President of the Canadian Dental Association*

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LETTERS



Dental Benefits Issues

Dr. Luc Dugal's reply to my critical letter on the assignment of benefits (Dental Benefits Issues (Letters To the Editor), *J Can Dent Assoc* 63:576-577, 1997) left readers no better informed than his original article (Assignment of Benefits (Dental Benefits Issues), *J Can Dent Assoc* 63:469-470, 1997) did.

While citing the implications of our dependence on the dental insurance industry as the basis for CDA's negative stance on "assignment," Dr. Dugal failed to elucidate any further on this cause and effect relationship.

He states that the only legal obligation dentists have in relation to dental insurers is "... to assure that the information on the claim form is accurate. Nothing more, nothing less." This is certainly a requirement, but it alone does not define our relationship to the underwriters who administer dental plans. Unless a specific legal precedent has been established, I believe that a court ruling would find that a business transaction occurs when dental treatment is carried out on the basis of a prearranged agreement delineating the procedures to be performed and the respective fees involved. A court could well rule that a submitted predetermination form equates to an "offer of sale," and that when the proposed treatment is authorized by an insurer ("offer to purchase"), and the predetermination form is duly signed by both parties, a transient, limited-term contract does exist. This contract expires on the receipt of payment by the dentist following the completion of treatment.

Dr. Dugal's lamentation about rejected "assigned" dental claims

is invalid, because dentists who accept assignment protect themselves by obtaining full pre-authorization of their proposed treatment plans before commencing treatment. The insurer's approval of a treatment proposal and its cost constitutes a contractual obligation. Contracts generate obligations, in this case the obligation for the insurer, on behalf of the patient's employer, to pay for the services the dentist provides to the patient. Unless the patient's eligibility changes during treatment, once a treatment plan is approved the dentist has the same legal recourse as anyone else if the insurer subsequently reneges on payment. Unlike capitation or managed care contracts, however, these "pre-determination" contracts expire on completion of the pre-approved treatment.

In fact, it is reasonable to presume that there is a greater probability of payment for dentists who bill large insurers than for those who gamble on the unpredictable behavior of patients who receive a cheque endorsed to them. More dentists have likely been "stung" by their patients than insurance companies. There is no reason on earth why the Alberta Dental Association, or the insurance carriers, should insist that the patient act as a courier/intermediary in the flow of data and, yes, cash, between dentist and insurance company.

Having acknowledged our significant dependence on dental insurance (he prefers the term "dental plans"), Dr. Dugal minimizes their necessity by stating that we should "... get out of the insurance business" He makes this statement as a conclusion to his complaint that dentists too often assume that patients "... will only access treatment that is covered by their dental plan" Prior to this, he suggests that "... the majority of treatment plan costs are incurred in the areas of prevention and minor restorations" What does he expect? Don't those categories represent the most common

needs among patients? I cannot even guess what Dr. Dugal means when he skirts around such buzzwords as "entitlement mentality." In addition, in criticizing the rationale of consulting the patient's detailed coverage during treatment planning, he refers to some unexplained concept of "... treatment based on values"

Whatever Dr. Dugal intends "entitlement mentality" to mean, he accuses patients, dentists, employers and insurance companies of being adversely afflicted with this condition. Ultimately, one gets the distinct feeling that Dr. Dugal resents the manner in which patients utilize their dental insurance coverage, but he is unwilling, even in his lengthy letter, to articulate the actual procedures that he would see their funds allocated to. He does not clearly advocate prevention, nor solid gold, Park Avenue, full-mouth rehabilitation. Just what kind of amazing dental plan is he talking about when he states that employers, who can no longer afford comprehensive dental insurance, could do so via "... properly designed dental plans ..."? Again, he chooses not to share this tantalizing information with us.

I was relieved to read that dentists are free to accept assignment without CDA's permission. It is reassuring to think that CDA will not likely attempt to mandate against it. However, as it has not been conclusively shown, by Dr. Dugal or others, that assignment works against the collective interests of dentistry, it would not be unreasonable for readers to question why this debate is occurring at all.

Donald F. Mulcahy, DDS
Edmonton, Alberta

SLSA Program

On reading the October and November issues of the *Journal of the Canadian Dental Association*, I came across the Self-Learning Self-Assessment (SLSA) feature. Having had long experience in developing multiple-choice questions

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The recent edition of the Sanford Guide to Antimicrobial Therapy 1996 recommends

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Empirical Antimicrobial Therapy on Clinical Grounds¹

(¹Optimal antimicrobial therapy is based upon accurate indications and susceptible testing of casual agents; these are only "INITIAL" guidelines)

Anatomic site/Diagnosis/ Modifying circumstances	Etiologies (usual)	Suggested Regimens*		Therapeutic Measures and Comments
		Primary*	Alternative**	
Odontogenic Infection	Oral microflora	Clindamycin 300 mg q6h po	Erythromycin 500 mg q6h po or AM/CL+++ 500/125 mg bid po	[†] Surgical drainage and removal of necrotic tissue essential. β-lactamase resistant organisms are increased in frequency.**

+ : Dosages suggested are for adults, with clinically severe (often life-threatening) infections. Dosages also assume normal renal function, and not severe hepatic dysfunction.

++ : Alternative therapy includes these considerations: allergy, pharmacology/pharmacodynamics, compliance, local resistance profiles.

+++ : AM/CL = amoxicillin/clavulanate

Adapted from Sanford 1996

*Penicillin, which was the antibiotic of choice for a long time, induces the production of β-lactamase by certain anaerobes, specifically *Bacteroides* species, and clinical failures have been increasingly reported in the literature.²

**In Canada, most *Bacteroides* species are resistant to Penicillin.³

°Dalacin® C capsule is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *Bacteroides* species, *Peptostreptococcus*, anaerobic *Streptococci*, *Clostridium* species and *microaerophilic Streptococci*. Also indicated in serious infections due to sensitive gram-positive organisms (*Staphylococci*, including penicillinase-producing *Staphylococci*, *Streptococci*, and *Pneumococci*) when the patient is intolerant of, or the organism is resistant to other appropriate antibiotics. °Dalacin® C capsule is indicated for prophylaxis against α-hemolytic (*viridan* group) *Streptococci* before dental, oral and upper respiratory tract surgery.

Most commonly reported side effects are diarrhea (2.6%) and vomiting (1.6%). For warnings, please refer to the prescribing information.

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while I was director of the office of health sciences educational development at the University of Western Ontario, I couldn't resist looking at the questions in the SLSA. I was dismayed to find so many problems.

For example, in the October issue,¹ Question 1 (p. 669) is presumably a one-best-answer type, and the correct answer is listed as "E. All of the above." This means that the learner need identify only two of A, B, C and D as being correct to know that the correct answer is E; i.e., the respondent need know only half of the information to get the correct answer.

In Question 2 on the same page, the authors create their own code for combinations of questions, and then make two of the distracters (2 and 4) contradictory. That, plus the obvious observation that 1 and 2 and 3 and 4 are probably inconsistent with each other, makes even a non-dentist realize that C can be the only appropriate answer.

In Question 4 (p. 671), the responder again has to adjust to a new answer key. In addition, since 5 is obviously correct — even a non-dentist would know that — and 3 is obviously wrong, it takes no dental knowledge to know that C is the correct answer.

In Question 6 (p. 672), in the new questions section, the authors again fall in the "E. All of the above" trap. Question 7 is ridiculously simple. Question 8, is peculiar, since distracter 1 is listed as being an answer in all the possible alternatives in the key. Thus it is no distracter at all. In Question 9, distracter 4 (which is a fundamental ethical principle) makes it clear that only C or D could be correct. Therefore, the respondents immediately have an almost 50 per cent chance of getting the correct answer. Question 10 is also a give-away. Codeine would not be an over-the-counter drug if it caused drug dyscrasias, and virtually all drugs have been found to cause nausea, dizziness and constipation in some individuals.

The questions in the November issue² are similarly flawed, but I draw your attention to Question

11 (p. 743), in which the "always" and "only" assure even the most naive biologist that distracters A and B are incorrect.

These many errors make me wonder how the SLSA program can be of any value in the continuing education of dentists?

Bruce P. Squires, MD, PhD
Ottawa, Ontario

References

1. Self-Learning Self-Assessment. *J Can Dent Assoc* 63:669-673, 1997.
2. Self-Learning Self-Assessment. *J Can Dent Assoc* 63:741-744, 1997.

SLSA Corporation's Response

Your comments relating to the SLSA Program's question construction have been reviewed by SLSA. They would be entirely correct and appropriate if SLSA were considered to be a formal educational examination, which it is not.

Instead, the program, as its name suggests, is an attempt to encourage general practitioners in dental practice to expand their knowledge base by introducing them to various current articles in the dental literature.

The questions are meant to be easy, even allowing for a correct answer by the process of elimination. The program is intended to be a fun process more in the nature of a puzzle. The intent is that participants will be turned on, as well as being able to assess their knowledge and expand it, not only through the rationale, but through reading of the given references.

Should the questions be made of a more formal nature, and thus more difficult to answer, it has been our experience that the dentist becomes negative towards the program and turned off.

Kenneth C. Bentley, DDS, MD, CM
President, SLSA Corporation

Letters To the Editor

Having just read the December issue of the *CDA Journal*, I would like to make a comment about the "Letters To the Editor" section. Seven pages of point and counterpoint may be a bit overwhelming. I do not know if you edit the letters or the rebuttals, but I find that the points are often lost in verbiage. In

my other role as the *CAO Bulletin* editor, I have often edited letters to both shorten and clarify the comments. Perhaps a limit on the number of words may be one way to force the initial writer and the respondent to be more succinct ... and I would strongly suggest that annotated references be deleted.

However, I was most impressed to see that students are contributing to the professional dialogue. Good on them and may there be many more. Even articles that describe their dental educational curriculum might be of interest to some of us older practitioners.

On a final note, the Touyz article "Oral Scurvy and Periodontal Disease" (*J Can Dent Assoc* 63:837-845, 1997) was, in my opinion, over referenced (126 references). My rough ruler count of text to references yielded a ratio of 105:85. While this may be acceptable in a purely scientific paper, I find the ratio to be cumbersome and "ivory towerish" for a general readership.

Ken Glover, DDS, MSD,
MRCD(C)
Edmonton, Alta.

Poor Kids

I enjoyed your November editorial about poor kids (O'Keefe, J. Poor Kids' Teeth: A Crying Shame. *J Can Dent Assoc* 63:723, 1997). Child poverty is supposed to be a high priority of our government right now, as it should be. But what is child poverty? Is this a quantity or quality question? Our profession can play a role in fighting child poverty by enhancing the quality of their life through good dental health.

Our government could make a commitment to fighting child poverty by making the fees for all dentistry provided to identified needy children a tax creditable amount, and allowing community care organizations to issue charitable receipts.

Essentially, when community care organizations identified a dentally needy child with no source of

... Continued on page 103

NEWS UPDATE

Ice Storm Shuts Down CDA Headquarters

The ice storm that hit Central and Eastern Canada January 6 shut down CDA's Ottawa headquarters building for two days.

"We lost our electricity in the middle of the night January 7," said CDA's director of administration Mr. Joel Neal. "When staff arrived at work, they were advised to go home and wait out the storm. With no heat, no lights, no phones and no computers, our only option was to close the building and lock the doors. It would have been dangerous to have remained open."



CDA's director of administration, Mr. Joel Neal

The two-day power outage forced CDA to close its doors Jan. 8 and 9. Although dentists who phoned the building over those two days would have heard ringing in their receiver, CDA's phone system was down and no incoming calls could be answered.

Power was restored to the association's headquarters building Jan. 10, allowing staff to return to work Jan. 12.

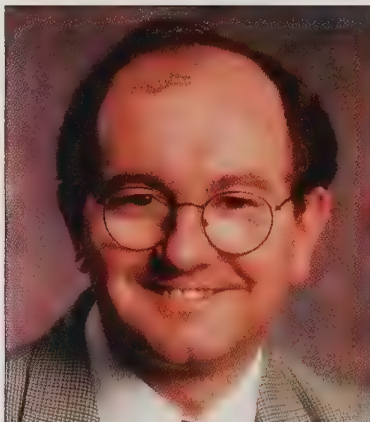
Other than a few broken tree branches, CDA did not experience any property damage as a result of the storm. However, a number of CDA staff had no electricity at their homes for more than a week, and a state of emergency was declared in Ottawa from Jan. 8 to Jan. 12. ■

CDA Journal To Launch On-Line Presence

Dentists across Canada will soon be able to access an abbrevi-

ated version of the *Journal* through CDA's Web site.

Initially, the on-line *Journal* will feature the most recent editorial, contents page, and cover. It will also include the publication's guidelines for contributors and an introduction from the editor, Dr. John O'Keefe.



Journal editor, Dr. John O'Keefe

"This is really just the beginning," said Dr. O'Keefe. "Ultimately we plan to expand the on-line *Journal* to include research articles of interest to the world dental community, and make it more of an interactive information source. Our short-term goal is to develop a unique electronic product that will enhance the print version of the *Journal*. For example, we could publish the abstract of a scientific research paper in the print version of the *Journal*, but put the full text of the article on-line. In the long-term, however, as dentists become more comfortable with Internet technology, we could publish a complete on-line version of the *Journal*. Ultimately, we could eliminate the print version altogether and make back issues of the *Journal* available on CD-ROM."

CDA will continue to survey dentists on their use of computer technology and the Internet. In addition, the *Journal* is launching a monthly technology column to help dentists increase their computer knowledge, and promote the use of computers as business and communication tools.

The on-line version of the *Journal* will soon be available on the public side of CDA's Web site. ■

CDA Holds Fluoride Conference

Canadian dentistry could soon have a new common standard for fluoride supplementation.

CDA held a national "Canadian Consensus Conference On the Appropriate Use Of Fluoride Supplements For the Prevention Of Dental Caries In Children" in Toronto November 28-29.



CDA's associate executive director, Mr. Brian Henderson

"In young children, even those who live in areas without fluoridated drinking water, fluoride supplementation can be associated with increased risk of dental fluorosis," said CDA's associate executive director Mr. Brian Henderson. "From both a legal and a patient health perspective, it is important for dentistry to develop general acceptance of appropriate guidelines on fluoride supplementation. CDA wants these guidelines to recognize fluoride's benefits in terms of caries control, as well as the need to consider the patient's overall exposure to fluoride from many sources."

CDA approved fluoride supplementation guidelines in 1992, following a national scientific workshop. The guidelines were not universally accepted by other medical and dental organizations, however, and there is currently no single recommended schedule for fluoride supplementation in Canadian children.

The ultimate goal of the 1997 national conference was to develop universal guidelines on fluoride

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"Recognized by
the Canadian Dental
Association"





Winter Mug Up, by Dr. Toby Gushue

supplementation in children, and gain acceptance for a single supplementation schedule. ■

The "Art" and Science of Dentistry

Beginning this month, the cover of the *CDA Journal* will feature the art, photography, and sculpture of Canadian dentists.

"The *Journal* is really a showcase for Canadian dentistry," said *Journal* editor Dr. John O'Keefe. "Now we hope to make it a showcase for dentists whose talents extend beyond the practice of dentistry."

"Dentistry is an art as well as a science-based discipline. Many dentists were attracted to the profession because it offered them an opportunity to work with their hands and express their creativity while helping others. This combination of manual dexterity and creativity has also allowed several dentists to become highly talented artists, sculptors and photographers."

The first painting to appear on the cover of the *Journal* is a watercolor by CDA president Dr. Toby Gushue. Although painting is more of a hobby than a vocation for the St. John's, Newfoundland, dentist, he has enjoyed some commercial success. Prints of his work are sold by galleries in St. John's, and one of his original watercolors is hanging in the boardroom at CDA's Ottawa headquarters.

"I would like to invite Canadian dentists who paint, take photographs, sculpt, carve or indulge in other creative hobbies to submit examples of their work that could appear on the front cover of future editions of the *Journal*," said Dr. O'Keefe. "I know that many of our readers have developed their creative talents to a very high level, and I would like to give them an opportunity to share those talents with their colleagues."

The art, photography, and sculpture submitted by Canadian dentists that appear on the front cover of the *Journal* will also be displayed on CDA's Web site.

For more information on how to submit your artwork for consideration, please contact Mr. Terence Davis by phone (613) 523-1770 (Ottawa area) or 1-800-267-6354 (outside Ottawa area), fax (613) 523-7736, or e-mail (tdavis@cda-adc.ca). ■

B.C. College To Be Restructured

The College of Dental Surgeons of British Columbia plans to give up its member services responsibilities and transfer them to two new professional associations.

In a December 18 media release announcing the change, the college stated that it will "divest itself of its member services responsibilities" by this summer.

"At that time," states the release, "new professional associations for dentists and certified

dental assistants will be created to fulfil these roles. The college will then function exclusively as the regulatory authority for both professional groups."

It is anticipated that elections for the board of directors of the new professional association for dentists will take place in April. Once an executive director is hired, the association will assume the college's member service responsibilities as well as the activities of the British Columbia Federation of Dental Societies. The federation, which was created by the college in 1994, is currently responsible for conducting an economic analysis of dental practices and developing a suggested fee guide.

"A recent survey indicated 80 per cent support by (B.C.) dentists for a member service organization which is separate from the college," said college president Dr. Hank Klein.

The majority of self-governing professions in B.C., including physicians, already have separate regulatory and member service organizations. ■

CDAnet Update

Many dentists now have access to the Internet, either at home or in the office, expanding their resources for continuing education and the exchange of information.

In addition to providing dentists with access to electronic information, however, the Internet has allowed dentists to communicate directly with their peers on networks such as the Ontario Dentist E-Mail Network (commonly referred to as ODEN).

Dentists also have numerous dental management software options to choose from. Although selecting the right software system can be a cumbersome and sometimes overwhelming experience, the wide selection of systems available also ensures a progressive and competitive marketplace.

This competition is also reflected in the growth of CDAnet. Over 30 software suppliers have obtained certification on CDAnet, which has allowed dentists to enjoy

faster claims adjudication and improved accounts receivables.

Created by dentists, CDAnet is a national network designed to facilitate the electronic transmission of dental plan claims to third-party carriers. No transmission fees or sign-up costs are charged to dentists participating in this program. In addition, electronic claims transmission usually results in patients being reimbursed faster, which may make them more receptive to accepting dental care.

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APPOINTMENTS

CAE Appoints New Officers

The Canadian Academy of Endodontics (CAE) has appointed its slate of officers for the 1997-98 term.



Dr. Raymond Greenfeld

Dr. Raymond Greenfeld of Richmond, B.C., was appointed president of the academy. A 1968 graduate of the University of Manitoba's dental faculty, he received his diploma in endodontics from the University of Oregon in 1980 and was recognized as a certified specialist in endodontics by the College of Dental Surgeons of British Columbia.

In 1985, Dr. Greenfeld became a diplomate of the American

Continued on page 92

BOARD OF GOVERNORS

NOTICE OF MEETING Interim Meeting

The Interim Meeting of the Board of Governors of the Canadian Dental Association will be held March 27 and 28, 1998 (Friday and Saturday), at the Westin Hotel, Ottawa, commencing at 9:00 a.m.

It is brought to your attention that the meetings of the Board of Governors are open to all members of the Association.

The Board is composed of twenty-six governors with voting privileges and a chairman. Governors represent members across Canada on a 1 to 500 ratio. The Canadian Forces Dental Services and Student members are represented by one member each.

In addition, there are two non-voting members, namely the senior dental representative of Health Canada and Veterans Affairs Canada.

A complete listing of the Board of Governors follows:

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SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise.

It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1997-1998 quiz will appear in the June 1998 issue of the *Journal*. Answers to the quiz will be published in the July-August 1998 issue. Dentists who complete the quiz may be eligible to receive continuing education points. The names and license numbers of all dentists who complete the quiz will be forwarded to their respective provincial licensing bodies for consideration. Quiz results will not be provided to individual dentists, and will only be forwarded to those provincial licensing bodies which specifically require them to assess the eligibility of participating dentists to receive continuing education points.

Questions 21 through 25 are a repeat of the questions that appeared in the January issue of the *Journal* accompanied with correct answers, the rationales and specific references. Questions 26 through 30 are new questions. The correct answers, rationales and specific references will be provided in the March 1998 issue. Keep all copies of the *Journal* so you can correctly respond to the June 1998 quiz.

QUESTION 21

The incidence of dry socket following mandibular third molar extractions can be reduced by preoperative use of a chlorhexidine gluconate mouth rinse and pre-extraction control of pericoronitis.

Fibrinolytic alveolitis most frequently occurs in the maxillary posterior sextants.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: A

RATIONALE:

"Dry socket" or fibrinolytic alveolitis is a common clinical problem especially after the extraction of a mandibular third molar.

A definitive etiology for this condition has not been established. Several theories have been tested and include a fibrinolytic mechanism, operative trauma, bacterial contamination, nutritional deficiencies and herpes simplex infection.

Ninety-five per cent of dry socket cases occur in the mandibular posterior sextants.

Many agents and techniques have been used to prevent the occurrence of dry socket. These include irrigation and mechanical debridement of the extraction socket, preoperative and postoperative rinsing with antibacterial mouth rinses, application of topical antibiotics, placement of collagen carriers impregnated with antibiotics and steroids into the extraction socket, the administration of systemic antibiotics and topical and systemic antifibrinolytic agents.

It would appear from a recent review¹ that in the case of impacted third molars, the complication of "dry socket"

can be much reduced by preoperative use of a mouthwash containing chlorhexidine gluconate and the management of any pericoronitis that may be present. On removal of the tooth, the socket should be washed with saline and dressed with gelatin sponge impregnated with topical tetracycline.

REFERENCES:

- 1) Swanson, A.E. Prevention of dry socket: An overview. *Oral Surg Oral Med Oral Pathol* 70:131-136, 1990.
- 2) Betts, N.J., Makowski, G., Shew, Y.H. et al. Evaluation of topical viscous 2.0 per cent lidocaine jelly as an adjunct during the management of alveolar osteitis. *J Oral Maxillofac Surg* 53:1140-1144, 1995.

QUESTION 22

The youthful face when compared with the face of the elderly shows

1. less tissue fat;
2. skin ptosis;
3. a full vermilion border to the lips;
4. prominent naso-labial folds.

- A. (1) and (2)
- B. (1) and (3)
- C. (3) and (4)
- D. All of the above.

ANSWER: B

RATIONALE:

In youth, the perioral area displays minimal nasolabial folds, a full interlabial line above the incisal line and a full vermilion border with a lower lip vermilion display 1.5 to two times that of the upper lip. With aging, the nasolabial folds become prominent and there is a thinning of the

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vermilion border. A smooth well defined mandibular line denotes youth as opposed to the loss of this definition with aging. This is caused by loss of tissue tone, accumulation of neck fat and ptosis of the skin. Because of these general changes of aging in the facial and perioral tissues and particularly the loss of facial muscular tone, there is reduced exposure of teeth when smiling.

REFERENCE:

- 1) Koury, M.E., Smith, J.P. and Epker, B.N. The aged face: the facial manifestations of aging. *Int J Adult Orthodon Orthognath Surg* 6:81-95, 1991.

QUESTION 23

A patient presents in your office complaining of a very painful mouth. Examination reveals multiple soft tissue ulcers surrounded by erythematous mucosa. She states that she is receiving injections to treat a cancerous lesion in her abdomen. Your tentative diagnosis of the mucosal lesions is

- A. aphthous ulcerative;
- B. lichen planus;
- C. ulcers related to chemotherapy;
- D. erythema multiforme;
- E. metastatic lesions.

ANSWER: C

RATIONALE:

The assumption must be that the injections the patient is receiving constitute chemotherapy of her malignancy. Forty per cent of patients receiving chemotherapy will develop significant oral problems. The stomatotoxicity of the agent can be divided into direct and indirect effects.

Oral mucosal cells undergo rapid renewal and a chemotherapy agent may cause a reduction in the renewal rate with consequent mucosal atrophy and ulceration. This is one example of direct stomatotoxicity. Clinically, patients experience severe pain from the ulceration which generally occurs in the non-keratinised surfaces of the mucosa.

Indirect stomatotoxicity is best exemplified by the effect on bone marrow cells which can result in granulocytopenia and thrombocytopenia. The granulocytopenia opens the way to opportunistic infection which in the mouth can be bacterial, fungal, viral or mixed. The thrombocytopenia can lead to bleeding because of platelet reduction. Patients may also experience xerostomia and taste changes.

Patients must establish impeccable oral hygiene. A soft brush is recommended but if brushing is difficult, a soft sponge or gauze may be used to assist in cleaning. Chlorhexidine gluconate mouthwash can also be recommended but if the alcohol content in it causes too much discomfort, a switch to salt or baking soda in water can be useful alternatives.

REFERENCES:

- 1) Sung, E.C. Dental management of patients undergoing chemotherapy. *J Calif Dent Assoc* 23:55-59, 1995.
- 2) Fattore, L.D., Baer, R. and Olsen, R. The role of the general dentist in the treatment and management of oral complications of chemotherapy. *Gen Dent* 35:374-377, 1987.

QUESTION 24

In the periodontal screening and recording method (PSR), code 2 indicates that

1. the colored area of the probe is visible;
2. no bleeding is present;
3. no subgingival calculus is detected;
4. subgingival calculus is detected;
5. bleeding is present.

- A. (1) and (2)
- B. (1) and (3)
- C. (1) (2) (3)
- D. (1) (4) (5)

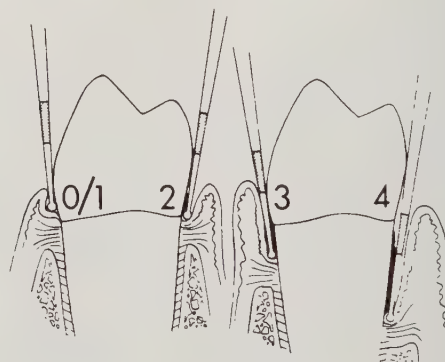
ANSWER: D

RATIONALE:

In order to collect data for the World Health Organization on the prevalence and severity of periodontal diseases worldwide, an index was developed and named the Community Periodontal Index of Treatment Needs (CPITN). PSR was introduced as a modification of CPITN.

Simplicity is the key to both screening processes. The examination probe has a colored band extending between 3.5 mm to 5.5 mm from the tip which has a 0.5 mm ball shape. As a tactile instrument, the probe has several important characteristics to which attention should be drawn. The specifications for the original instrument were that the overall weight not exceed 5.0 g, the handle thickness be 3.5 mm with a total length of 135 mm. These linear and weight measurements reduce the risk of excessive force application to the soft tissues under examination and increase the ability of the operator to detect subgingival calculus, root roughness and overhangs on restorations.

The mouth is divided into sextants and the crevice of each tooth is explored by a walking action in at least six points (mesiofacial, midfacial, distofacial and corresponding lingual areas).



For each sextant, the highest code found represents the health status of that sextant. If after examination of the first tooth in a sextant, a code 4 is identified, no further examination of that sextant is required for coding purposes. Since the examiner only records the worst score in a sextant, PSR takes only two to three minutes.

Code 0 - means that the colored area of the probe is completely visible when measuring the crevice. No calculus is

detected, no defective margins of restorations are found and there is no bleeding after gentle probing. This is a healthy status.

Code 1 - means that the colored area of the probe is again completely visible, no calculus or defective margins are found BUT some bleeding on gentle probing is present.

Code 2 - means that the colored area of the probe is visible BUT subgingival calculus and/or defective margins are detected and bleeding is present.

Code 3 - the colored area of the probe is partially visible at its deepest probing depth. This implies that a periodontal pocket is present.

Code 4 - the entire colored area has disappeared indicating a probing depth greater than 5.5 mm. This suggests bone involvement.

It should be noted that in a recent study⁴ the PSR method was found to be more accurate than radiography in the determination of a patient's periodontal status.

REFERENCES:

- 1) Ainamo, J., Barmes, D., Beagrie, G.S. et al. Development of the World Health Organization (WHO) Community Periodontal Index of Treatment Needs (CPITN). *Int Dent J* 32:281-291, 1982.
- 2) LoFrisko, C. and Bramson, J.B. Periodontal screening and recording: perceptions and effects on practice. *JADA* 124:226-232, 1993.
- 3) Davis, T. PSR offers quick easy periodontal screening. *J Can Dent Assoc* 61:770, 1995.
- 4) Khocht, A., Sohn, H., Deasy, M. et al. Screening for periodontal disease: Radiographs vs PSR. *JADA* 127:749-756, 1996.

QUESTION 25

For cardiopulmonary resuscitation (CPR) of adults, the American Heart Association guidelines recommend that the

1. rate of chest compression be 80 to 100 per minute;
2. rate of chest compression be 40 to 60 per minute;
3. point of chest compression be over the lower one third of the sternum;
4. point of chest compression be over the xiphoid process;
5. chest depression be 4.0 to 5.0 cm.

- A. (1) and (4)
- B. (2) and (4)
- C. (1) (3) (5)
- D. (2) (3) (5)

ANSWER: C

RATIONALE:

As an emergency procedure, cardiopulmonary resuscitation provides circulation of oxygenated blood to vital organs. External chest compression of an adult patient should, according to the American Heart Association guidelines, be at the rate of 80 to 100 per minute. External chest compression should occur on the lower one third of the sternum (never over the xiphoid process). The sternum should be depressed 4.0 to 5.0 cm for adults and 2.0 cm

for children. CPR should only be performed on those patients who have experienced respiratory and cardiac arrest.

A dental office must always be ready for a medical emergency and all staff should receive annual training in basic life support. Knowing who to call in a medical emergency is also essential and there must be no hesitation to call for medical assistance at any time.

Effective CPR can only be given when the patient is flat with the head no higher than the level of the heart. Time is of the essence and should not be wasted in trying to determine the cause of the cardiopulmonary arrest before instituting CPR.

REFERENCES:

- 1) Malamed, S.F. Managing medical emergencies. *JADA* 124:40-53, 1993.
- 2) Standards for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC). *JAMA* 255:2905-2932, 1986.
- 3) Treasure, T. The new standards and guidelines for CPR. *Oral Health* 80:31-35, 1990.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 26

The difference between cracked tooth syndrome and a vertical root fracture is that the latter is limited to the root with the fracture line running buccolingually.

In vertical root fractures the fracture line may not be visualized radiographically.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

QUESTION 27

Studies, using a dental pain model, have shown that ibuprofen 400 mg, when given orally, is superior to

1. acetaminophen 1000 mg;
2. acetaminophen 600 mg with codeine 30 mg;
3. ASA 650 mg with codeine 60 mg;
4. ketorolac (Toradol) 10 mg.

- A. (1) only
- B. (1) and (2)
- C. (1) (2) (3)
- D. All of the above.

QUESTION 28

The use of a composite resin for retrograde root fillings demands that

- A. the resin be condensed into an undercut at the root end;
- B. the resin be coated on the root end dentin;
- C. the root end dentin be treated with Gluma before applying the resin;
- D. the root end dentin be air-dried only before the resin is applied.

QUESTION 29

Metronidazole should not be prescribed for patients who are pregnant.

Patients taking metronidazole should not drink alcohol.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

QUESTION 30

The integrity of fissure sealants is critical to success in prevention of caries and directly dependent upon acid conditioning of the enamel surface.

The highest bond strengths of fissure sealants are achieved using a 37 per cent solution of phosphoric acid applied for 15 seconds to the enamel.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is

intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Colgate, the Fowler-Pearce Partnership (Scotia-McLeod), Nobel Biocare, and SciCan.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education points required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education points.

Funding for the SLSA program has been provided by:



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Board of Endodontics and a fellow of the Royal College of Dentists of Canada. He currently maintains an endodontic practice in Richmond, and was a guest lecturer at the University of Southern California and the University of Oregon.

Dr. Greenfeld will be joined on the CAE executive by Dr. Richard Hunter of Toronto, Ont. (president-elect); Dr. Tom Mather of Edmonton, Alta. (treasurer); Dr. Carl Hawrish of Edmonton, Alta. (executive secretary); Dr. Marc-André Morand of Québec, Qué. (constitution and bylaws); and Dr. Calvin Pike of Kitchener, Ont. (past-president). ■

UWO Appoints New Dental School Director

The University of Western Ontario has appointed a new acting director to head its dental school.

Dr. Stanley L. Kogon was appointed acting director January 1, and will hold the position until June 30, 1999. He has served as chair of the department of oral medicine, as well as chair of the divisions of periodontics, and oral medicine and radiology, for 20 years.



Dr. Stanley Kogon

Since 1995, Dr. Kogon has also served as assistant dean of clinical affairs. He was recently named assistant director of clinical affairs.

Dr. Kogon's first order of business will be to smooth the integration of the UWO dental school into the university's recently created faculty of medicine and dentistry, and explore opportunities for program enhancement. ■

CDA 1998 Nominations Sought

CDA is seeking nominations for its 1998 awards, including CDA Honorary Membership, Distinguished Service, and the Award of Merit. Nominations received by March 31 will be reviewed by the CDA Nominations and Awards Committee, which will then make recommendations on suitable award winners to the association's Executive Council. The 1998 award recipients will be named during the annual meeting of the CDA Board of Governors in Ottawa.

No more than one individual should be proposed for Honorary Membership or the Distinguished Service Award, and submissions must include detailed curriculum vitae for each nominee. Although submissions should indicate the award an individual is being nominated for, the nominations committee reserves the right to recommend which award, if any, will be granted to that person.

Honorary Membership

The association's highest honor is Honorary Membership, which recognizes individuals deemed to have made outstanding contributions to the art and science of dentistry, or to the dental profession, over a sustained period of time. Although this award may be for service that is provincial, national or international in nature, an outstanding contribution at the national level should be a principal consideration.

In general, only one or two honorary memberships are awarded annually and CDA may elect not to present this award in any given year. Winners receive a personalized framed certificate and a lapel pin. Honorary members who are licensed dentists are exempt from CDA membership dues, and all winners may attend association-sponsored scientific and social functions, as well as annual meetings and conventions at no cost.

Distinguished Service Award

CDA's Distinguished Service Award is presented to dentists or laymen to recognize either an outstanding contribution in a given year or outstanding service over a number of years. It may also recognize outstanding contributions to the dental profession at the academic, corporate, specialty society, council or committee level. Recipients receive an engraved plaque.

Award of Merit

The Award of Merit is presented annually to an individual who has served in an outstanding capacity in the governing of CDA or who has made similar contributions to Canadian dentistry. Candidates should have served at least two full terms as a governor of the association or two full terms on the Executive Council, or four years as a council, commission or committee chairman, or a number of years with a dental organization, institution or specialty section. Recipients receive an engraved plaque.

Certificate of Merit

The Certificate of Merit recognizes special service at any level of dentistry. In general, it is reserved for Canadian dentists and other individuals who have given at least one full term of service on a council, commission or committee of CDA, or long-standing service at the corporate or specialty section level. The awards committee will not receive nominations for this award. Recipients will be selected by the committee.

Nominations for Honorary Membership, Distinguished Service or the Award of Merit should be submitted by March 31, 1998, to:

**CDA Committee on Nominations and Awards,
Canadian Dental Association,
1815 Alta Vista Drive, Ottawa, ON K1G 3Y6**

Nominations should be kept in confidence until the final decision regarding awards has been made.

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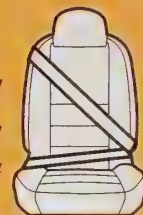
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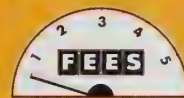
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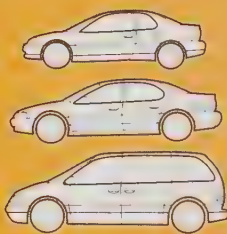
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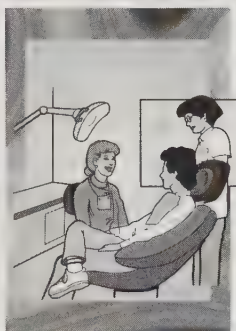
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DENTAL EDUCATION



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Jack D. Gerrow, DDS, MS, M.Ed.

David W. Chambers, Ed.M., MBA, PhD

Brian J. Henderson, BA (hons), M.Ed.

Marcia A. Boyd, DDS, MA

Background

Canada's 10 provincial licensing authorities recently requested extensive changes in the process used to certify the graduates of accredited faculties of dentistry in Canada. In response, the National Dental Examining Board of Canada (NDEB) began to formulate a new examination process, which involves a Written Examination and an Objective Structured Clinical Examination (OSCE). The Association of Canadian Faculties of Dentistry (ACFD), the Commission on Dental Accreditation of Canada (CDAC), and the Canadian Dental Association's Council on Education (CDA Council) were invited to participate in the development of the new examination process.

Following meetings of the NDEB/ACFD ad hoc advisory committee, it was agreed that the first step should be the identification of the competencies required for licensure as a general dentist in Canada. A national workshop was held to identify and develop these competencies. The 25 workshop participants included the 12 members of the advisory committee, the NDEB executive, and members of the NDEB Written and Clinical Examination committees, as well as representatives from the ACFD management committee,

the CDAC and the CDA Council. The names and affiliations of the attendees are listed in **Table I**.

Workshop participants, assisted by both the distributed resource material and facilitators, worked in small groups to develop the competency statements. Consistency in the format and level of the statements was ensured by the calibration of the working-group chairs, and by reviewing the statements at plenary sessions.¹ Participants approved the draft competency statements at the final plenary session, and charged a small group with editing the final document. The resulting draft document was reviewed by all participants, and circulated to a broad community of interested stakeholders for comment prior to its final revision and acceptance by NDEB.

This document was developed primarily to assist NDEB in developing the Written and OSCE Examinations. Competencies are therefore at a level that will guide the examination process, but not direct curriculum development in Canadian faculties of dentistry. The competencies were also distributed to ACFD's management committee, CDAC and the CDA Council for information. These organizations have further refined the competencies to make them more useful for the purposes of

curriculum planning and accreditation. "Competencies For a Beginning Dental Practitioner In Canada," is the first national consensus document on dental competency statements that has been developed and published.² It has been widely used as a resource document and reference by many national and international institutions and associations.

Definitions and Assumptions

1. Competence is behavior characterized by independent performance in realistic circumstances. The competencies identified in this document are required of all beginning dental practitioners in Canada. Higher levels of practice, including proficiency and mastery, may be attained with additional experience and education.
2. Competency assumes that all behaviors are supported by foundation knowledge and skills and by appropriate values. Foundation knowledge includes the biomedical, behavioral and clinical dental sciences. Beginning dental practitioners in Canada must be capable of applying foundation knowledge and skills and must be capable of using it to justify all of their decisions and actions. Therefore,

Table I

ACFD/NDEB Workshop On Clinical Competencies In General Dental Practice

Attendees	
1.	Dr. David W. Chambers — guest speaker and workshop facilitator
2.	NDEB/ACFD Ad Hoc Advisory Committee
	Drs. J.D. Gerrow Dalhousie and workshop facilitator
	D. Donaldson UBC and ACFD
	P.D. Schuller Alberta
	R.W. Loney Saskatchewan
	R.C. Baker Manitoba and NDEB
	D.W. Banting UWO
	N. Levine Toronto
	P. Duquette Montreal
	K.C. Bentley McGill
	D. Robert Laval
	G. Albert ACFD
	G.S. Beagrie NDEB
3.	ACFD — Dr. H. Lyttle
4.	NDEB — Drs. A.F. LaBounty, R.G. Canning, R. Salois, D.A. Scott, P.A. Watson, B.L. Pedlar, L.H. Harder
5.	CDAC — Mr. B. Henderson, Dr. R.I. Brooke
6.	CDA Council On Education — Dr. G. Thompson

foundation knowledge and skills are understood to be a part of every competency.

- Competency assumes that all behaviors are performed to an acceptable level and that the practitioner can evaluate the quality and effectiveness of all behaviors performed.
- To "manage" the identified oral health needs of a patient means that the dentist may provide no treatment, observation, treatment by the dentist, treatment by the dentist following consultation with another health care professional, referral of a patient to another health care professional for management of identified oral health needs and monitoring any treatment provided. Treatment is assumed to include all actions (including preventive proce-

dures and instructions) by a health care provider that are designed to alter the course of a patient's condition. A dental practitioner must always provide oral health care for patients in an ethical manner in accordance with legal requirements as stipulated at the national and provincial level.

- For the purpose of this document, the word "appropriate," when used as a modifier, implies modification or adjustment according to the specific circumstances (e.g. medical, financial, biomechanical, psychological) of a patient.

A Global Competency For a Beginning Dental Practitioner In Canada²

A beginning dental practitioner in Canada must be able to provide effective and appropriate oral health care for all patients. Oral

health care includes examination, diagnosis, risk assessment, development of a treatment plan and/or treatment plan options, obtaining informed consent and management of the patient's oral health needs in an ethical manner in accordance with the legal requirements of the national and provincial jurisdictions. In addition, a general dentist must be able to justify the diagnosis, risk assessment and treatment plan based on the etiology, epidemiology and pathogenesis of the conditions and the biological rationale involved. A general dentist must be able to determine the prognosis and to evaluate the success of the management modalities utilized for individual patients.

Competencies For Beginning Dental Practitioners In Canada²

A beginning dental practitioner in Canada must be competent to:

- communicate effectively with patients, peers and the public with respect to ethical issues and standards of care;
- identify the chief complaint or reason for a patient's visit;
- make a general evaluation of a patient's appearance and attitude including the identification of any abnormal physical, emotional, or mental development;
- obtain and interpret a medical history, social history, review of systems and dental history;
- conduct an appropriate clinical and radiographic examination, and distinguish between normal and pathological hard and soft tissue abnormalities of the orofacial area;
- assess the risks of radiation exposure and the diagnostic benefits of radiographic procedures, and select appropriate radiographs required for a diagnosis, taking cognizance of patient concerns and informed decisions;



7. take and process periapical, bitewing, occlusal and panoramic radiographs;
8. prescribe clinical, laboratory and other diagnostic procedures and tests in consultation with other health care providers as may be required for the proper dental and medical management of the patient;
9. interpret the findings from a patient's history, clinical examination, radiographic examination and from other diagnostic tests and procedures in order to identify the etiology and pathogenesis of oral conditions and growth disorders;
10. establish a diagnosis and develop a problem list of conditions and disorders requiring management;
11. determine the influence of the pathologic physiology of a systemic disease on oral health and management;
12. recognize the limitations of dental treatment in a general practice setting and formulate a written request for a consultation or referral when appropriate;
13. maintain accurate and complete patient records in a confidential manner;
14. develop an appropriate comprehensive, prioritized and sequenced treatment plan based on the evaluation of all relevant diagnostic data;
15. discuss the findings, diagnosis and treatment options with a patient and inform the patient or guardian of potential modifications and the consequences that could occur during the course of treatment;
16. present to a patient the sequence of treatment, the estimated fees, the payment arrangements, time requirements and the patient's responsibilities for treatment;
17. modify treatment plans for the medically, mentally or physically compromised or challenged patient;
18. select and use appropriate barrier techniques to prevent the transmission of infectious diseases;
19. select and use sterilization and disinfection procedures to prevent the transmission of infectious diseases;
20. explain and demonstrate infection control procedures to staff and patients, and respond to questions related to infection control;
21. recognize and institute procedures to prevent occupational hazards related to the profession of dentistry;
22. achieve local anesthesia for dental procedures;
23. prevent, recognize and manage potential complications related to local anesthesia;
24. determine the indications and contraindications for the use of drugs, the drug dosages and routes of administration for drugs used in general practice, and write appropriate prescriptions for drugs used in general dental practice;
25. recognize the common signs, symptoms and etiologies of anxiety and apprehension in dental patients;
26. implement appropriate management of the anxious or apprehensive dental patient;
27. prevent and manage dental emergencies;
28. recognize and manage systemic emergencies related to dental treatment;
29. manage patients with acute and chronic orofacial pain or discomfort including the provision of treatment normally provided in general dental practice;
30. manage surgical procedures related to oral soft and hard tissues including the provision of treatment normally provided in general dental practice;
31. manage trauma to the dentofacial complex;
32. manage complications associated with oral surgical procedures normally provided in general dental practice;
33. treat early and moderate forms of periodontal diseases and manage advanced periodontal diseases and monitor the effectiveness of treatment;
34. restore single tooth defects and esthetic problems, including the selection of materials and techniques;
35. manage partially and completely edentulous patients, including providing fixed, removable or implant prostheses normally provided in general dental practice;
36. manage pulpal pathology of primary and permanent teeth including the provision of endodontic treatment normally provided in general dental practice;
37. assess the dietary intake and oral hygiene status of a patient, in order to promote oral health and evaluate the effectiveness of a patient's self-care;
38. assess the need for and provide appropriate preventive procedures including topical and systemic therapeutic agents and modalities as well as instruction in mechanical oral health methods;
39. manage growth and developmental abnormalities and treat dental abnormalities normally treated in general dental practice;
40. recognize signs of physical or emotional neglect and/or abuse (including but not limited to child, spouse or elder abuse) and make appropriate reports and follow up the outcomes;
41. determine malocclusion treatment objectives and identify the treatment required to obtain these objectives;
42. explain the benefits of removable and fixed appliances in

orthodontic treatment to patients and guardians;

43. make acceptable casts and other records that are required for use in the laboratory fabrication of dental prostheses and appliances;
44. design a dental prosthesis or appliance, write a laboratory work authorization, and evaluate laboratory products;
45. determine the level of expertise required in the treatment of a patient and recognize the practitioner limitations so that the medical and dental well-being of the patient will not be compromised;
46. obtain informed consent and obtain the patient's written acceptance of the treatment plan and any modifications;
47. locate, read, understand and critically evaluate the published dental and related literature and apply such informa-

tion when evaluating new materials and procedures;

48. discharge obligations incumbent upon every professional including personal contributions to and support for the profession's collective initiatives in self-regulation, maintenance of standards and advancement of professional knowledge and expertise;
49. apply the basic principles of business administration, financial and personnel management to a dental practice. ■

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Mr. Brian J. Henderson is the associate executive director of the Canadian Dental Association, and the director of the Commission on Dental Accreditation of Canada.

Dr. Marcia A. Boyd is a professor, faculty of dentistry, University Of British Columbia, and the chief written examiner of the National Dental Examining Board Of Canada.

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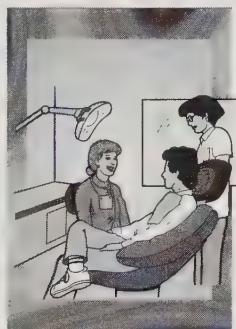
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DENTAL EDUCATION



Modifications To the National Dental Examining Board Of Canada's Certification Process

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ABSTRACT

Following a lengthy and intense consultation with stakeholders, and an analysis of the present certification process, the National Dental Examining Board of Canada (NDEB) and the 10 provincial licensing authorities recently approved major changes to the certification process for dental licensure in Canada. As of January 1997, graduates of dental programs accredited by the American Dental Association's Commission on Dental Accreditation (ADA Commission) must complete successfully the same examinations as graduates of programs accredited by the Commission on Dental Accreditation of Canada (CDAC) to be licensed to practice in Canada. In addition, NDEB's examination system for graduates of dental programs that are not accredited by CDAC or the ADA Commission (i.e. international programs) will be discontinued on December 31, 1999. As of January 1, 2000, graduates of non-accredited programs will be required to complete a CDAC accredited, university-based qualifying program to be eligible to participate in the same certification process as graduates of ADA Commission and CDAC accredited dental programs.

Background

NDEB was established by an act of Parliament in 1952.¹ Its purpose was to establish and maintain qualifying conditions for a national standard of competence for dentistry in Canada, and to issue a certificate to those dentists who met the standard.

From 1971 to 1993, graduates of undergraduate dental programs accredited by CDAC were granted a certificate on the basis of graduation from an accredited program. This was made possible through the involvement of NDEB in the CDAC accreditation process. NDEB members were appointed to CDAC's site survey accreditation teams, participated in the Clinical Outcomes Review Evaluation (CORE), and reviewed accreditation standards documents. In addition, two NDEB members were appointed to CDAC. This allowed NDEB to critically assess the evaluation process in each of Canada's accredited dental programs, and recognize that there was sufficient evidence that graduates met the national standard.

Graduates of all undergraduate dental programs not accredited by CDAC were required to complete successfully a written and a three-part clinical examination.²

In 1994, following a request from Canada's provincial licensing authorities, NDEB changed the certification process for graduates of CDAC accredited programs. To be certified, these graduates were required to pass the NDEB's Written Examination and the Objective Structured Clinical Examination (OSCE).² No changes were made to the certification process for graduates of programs not accredited by CDAC. **Fig. 1** shows the certification process in place from 1994 to 1996.

The results of the Written Examination for 1994 through 1996 are shown in **Fig. 2**. For comparison, the results for 1992 and 1993 are also provided. The high reliability coefficients (KR 20 > 0.96) show that this examination has extremely good reliability. As predicted by NDEB, the graduates of Canadian faculties of dentistry had very high (99 to 100 per cent) pass rates. Graduates of American programs had slightly lower pass rates, but the difference in the mean scores (three per cent to five per cent) between Canadian and U.S. graduates was small. There was, however, a large difference in the mean scores (eight to 15 per cent) and pass rates (93 to 100 per cent, 47 to 68 per cent) between

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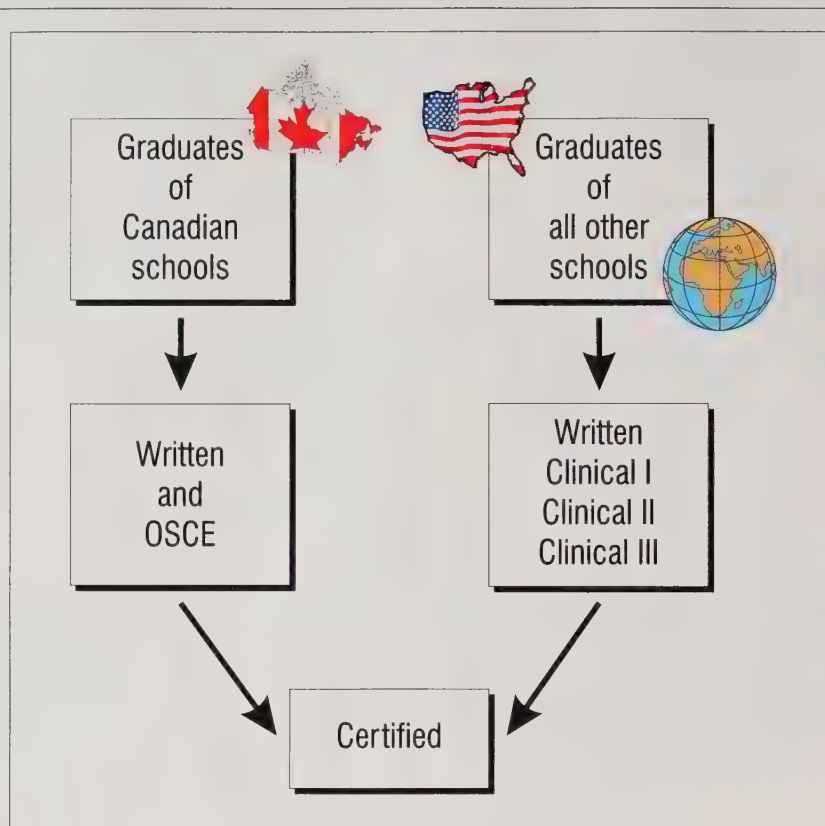


Fig. 1: NDEB Certification Process, 1994-1996.

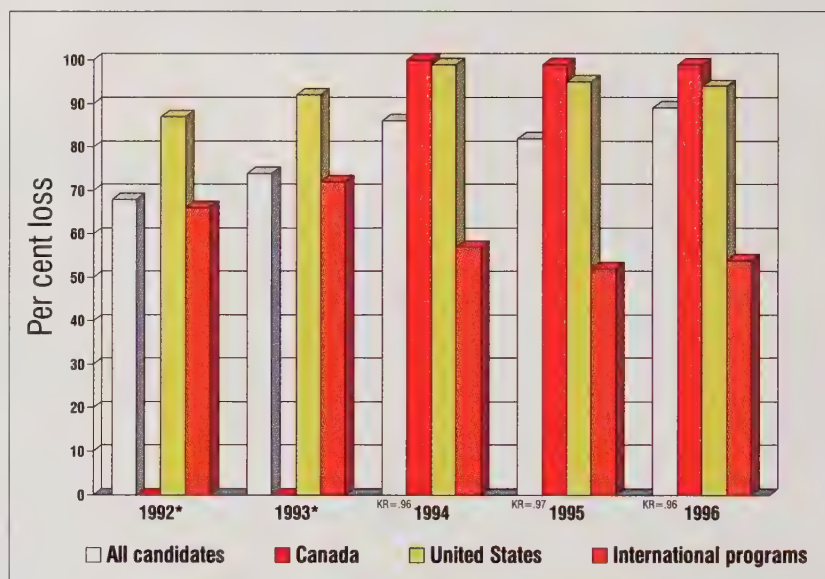


Fig. 2: Pass rates, NDEB written examination.

* Graduates of accredited Canadian programs were not required to take the examination in 1992 and 1993.

graduates of Canadian and U.S. programs versus graduates of international programs. These results led to further discussion regarding the certification process.

Following a comprehensive consultation process with the provincial licensing authorities, CDAC, the Association of Canadian Faculties of Dentistry (ACFD), the American Association of Den-

tal Schools (AADS), the ADA Commission and the Canadian Dental Association (CDA), a notice of motion was presented to the 1995 NDEB annual meeting. The notice of motion was also circulated to other stakeholders, which led to its subsequent revision. Several conditions that required action by ADA, ACFD and CDAC prior to NDEB adopting the

proposed motion were identified. In addition, to preserve the principle of national portability, there was consensus that the motion must be ratified by all 10 provincial licensing authorities.

In 1996, the ADA Commission, CDAC and ACFD confirmed that the required conditions could and would be met. The motion was subsequently passed by NDEB at its annual meeting in November, and ratified by all 10 provincial licensing authorities. CDA's council on education (CDA Council) and ADA's council on education (ADA Council) both confirmed that the changes were consistent with the intent of the ADA/CDA reciprocity agreement, which allows graduates of American and Canadian dental schools to seek licensure in either Canada or the United States with no requirement for further education.

The Revised Certification Process

Following a request from NDEB through the CDAC, the ADA Commission made changes to its accreditation procedures. These changes included the addition of state and national licensing board representatives to all site survey teams, formalizing the relationship between the ADA Commission and CDAC to guarantee formal representation and involvement in each other's accreditation processes, and the identification of outcome measurements similar to CDAC's CORE process. This allowed NDEB to verify that the accreditation processes of CDAC and the ADA Commission were equivalent.

As a result of this process, U.S. and Canadian graduates of accredited undergraduate dental programs will be considered to be "accredited graduates." To be licensed in Canada, these graduates must pass the NDEB Written and OSCE Examinations within seven years of graduation.

As shown in Fig. 3, for the three-year period from January 1, 1997, to December 31, 1999, graduates of non-accredited dental programs may be certified either by passing a comprehensive certification examination that consists of a written and

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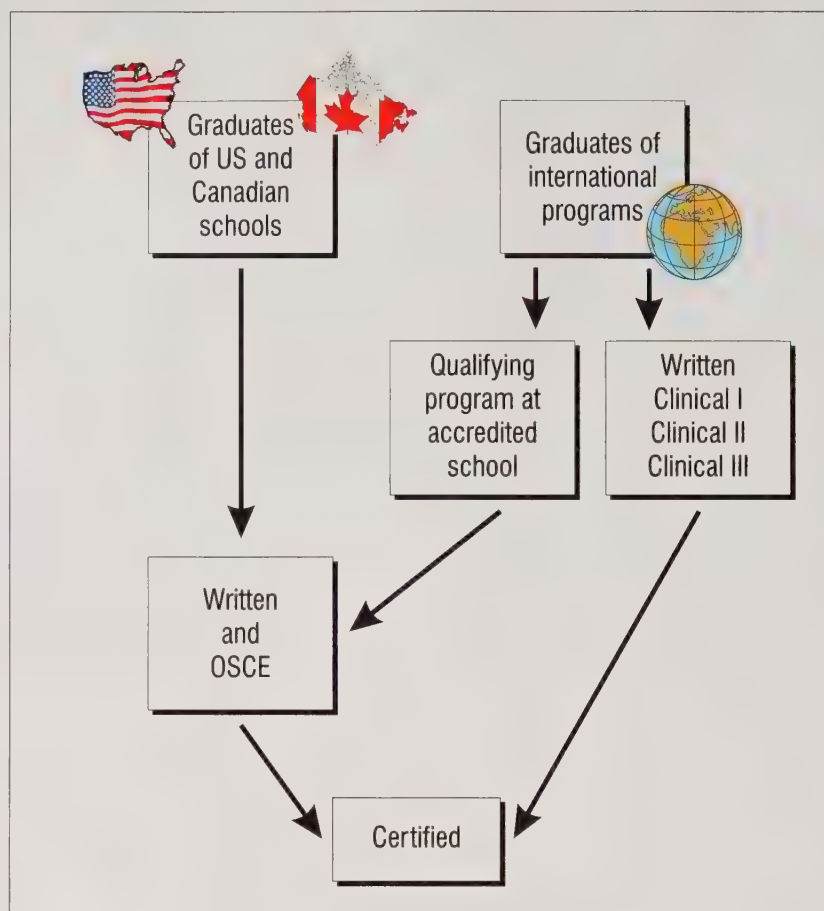


Fig. 3: NDEB Certification Process, 1997-1999.

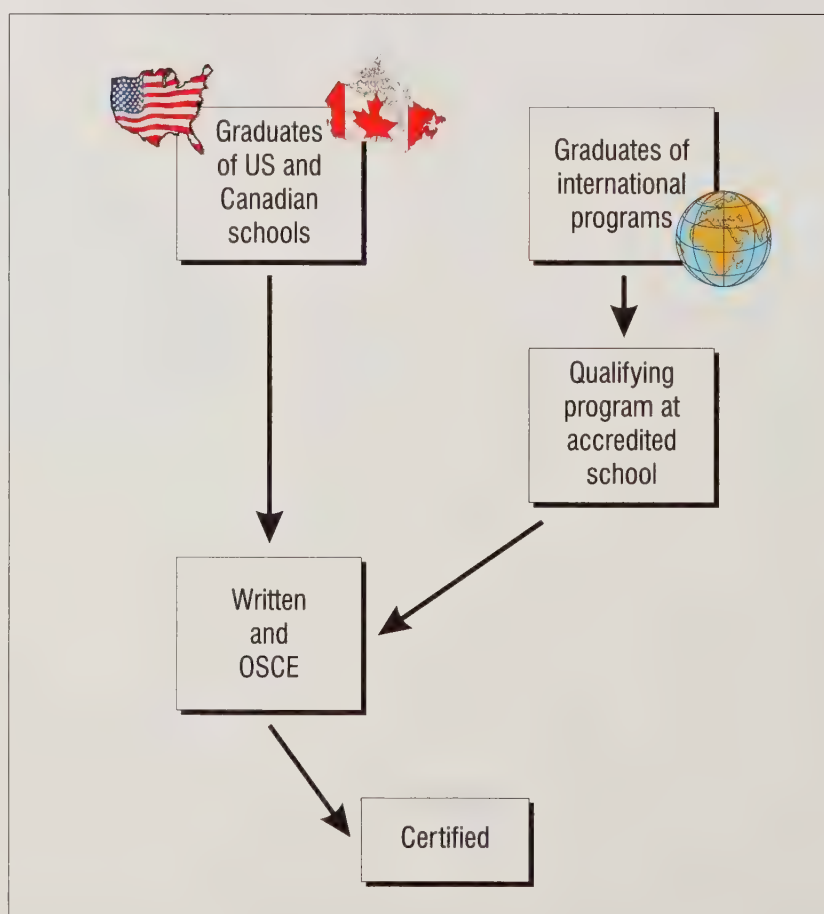


Fig. 4: NDEB Certification Process, after 2000.

three-phase clinical examination, or by graduating from a CDAC accredited qualifying program and then passing the NDEB Written and OSCE Examinations.

After December 31, 1999, NDEB will discontinue the three-phase clinical examination. Therefore, all graduates of non-accredited dental programs will have to complete a qualifying program to be eligible for dental certification and licensure in Canada (Fig. 4). The new certification process will be similar to the current process used for medical certification in Canada, which was supported by judicial decisions in 1986³ and 1988.⁴

With coordination by ACFD, several Canadian faculties of dentistry are now in the process of developing and implementing a two-year qualifying program for graduates of non-accredited dental programs. This will allow these graduates to complete a qualifying program prior to the discontinuation of NDEB's clinical examinations.

CDAC has developed an accreditation process for the qualifying programs, which included the establishment of accreditation standards. The standards ensure that a valid admission procedure, including an entrance examination, is used to select candidates at each participating dental school, that adequate resources are available for the qualifying program without diminishing the resources available to other CDAC accredited programs at the institution, and that an effective evaluation system is in place to ensure that the graduates of qualifying programs meet the same academic and clinical standards as graduates of the school's accredited DDS/DMD programs. Although admission procedures will be unique to each qualifying program, all applicants will be required to take ACFD's Eligibility Examination. This examination will assess the applicant's academic preparation in the biomedical and introductory clinical sciences.

Conclusions

1. Undergraduate dental programs in Canada and the Unit-

ed States follow rigorous and equivalent accreditation procedures, which are administered by CDAC and the ADA Commission respectively. NDEB recognizes these processes, due to their direct input and involvement in program evaluation.

2. The reciprocal agreement between the ADA Council and the CDA Council is maintained and remains unique, as no other jurisdictions participate in this agreement.
3. NDEB has established a reliable examination process, which supports:
 - a) the recognition of graduates of programs accredited by the ADA Commission; and
 - b) the opportunity for further education of graduates of non-accredited programs.
4. Graduates of non-accredited programs can apply for admission to accredited qualifying programs at Canadian faculties of dentistry. These qualifying programs will provide the academic and clinical experience necessary to meet the national standard for certification.
5. Graduates of all CDAC and ADA Commission accredited programs (including qualifying programs) will be required to complete successfully the same certification examinations (i.e. NDEB's Written and OSCE Examinations).
6. These changes are consistent with NDEB's mandate to establish and maintain qualifying and testing conditions for a national standard of competence, which the provincial licensing authorities can accept for entry into dental practice in Canada.

Dr. Jack D. Gerrow is an associate professor, faculty of dentistry, Dalhousie University, and executive director and registrar of the National Dental Examining Board Of Canada.

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Letters

Continued from page 81 ...

funding for dental care, they would refer that child to a volunteer dentist. Necessary dental work would be done, and the dentist would receive a charitable donation receipt from the organization for the full value of the services rendered. Although the dentist would essentially be working for nothing, the tax receipt would defray most of the overhead costs of providing care to the needy child.

Under the existing system, community care groups must ask dentists to not only donate their time to treat needy children, but also their overhead costs.

The government has created tax incentives to promote everything from oil exploration to Canadian movies. Isn't it about time they created tax relief that would enhance the quality of a poor child's dental health?

CDA should focus its attention on this truly worthy national issue, as a tax incentive would encourage dentists to become more philanthropic. The government could also take credit for creating this dental health opportunity for our poor children, who really need a better quality of life.

Ken Southward, DDS
Beamsville, Ontario

Poor Kids

As a dentist and the director of public health for downtown Toronto, let me congratulate you on your excellent editorial. With the increasing numbers of homeless people on our city streets — and the explosive growth of street kids with children under two — it is important for such a recognized body as CDA to express its concern about this unacceptable condition.

A few years ago, the Toronto Department of Public Health conducted an oral health survey of street youth, published in the *Journal*. It found that the level of poor oral health was far, far greater in this population than in the average Toronto youth population. In response, the dental profession in Toronto, working in collaboration with the agencies serving these youth, the public health department and others, have created a dental clinic in an agency that serves street youth.

This represents the powerful effect the dental profession can have when it works with others in the community. Your editorial appropriately raises the issue to the national level, and offers CDA the opportunity to be an advocate on behalf of poor children with the federal government, by calling for a national task force to address the issue of poor children and poor oral health.

Jack Lee, DDS, MPH, D.Grt.
Toronto, Ontario

Letters may be edited for space and clarity, at the discretion of the editor.

CLINICAL



Dens Evaginatus: Review Of the Literature and Report Of Several Clinical Cases

Kara J. McCulloch, DMD, MSD

Christine M. Mills, DDS, MS

Raymond S. Greenfeld, DMD, FRCD(C)

Jeffrey M. Coil, DMD, MSD, PhD, MRCD(C)

ABSTRACT

Dens evaginatus (DE) presents as an innocuous looking tubercle of enamel on the occlusal surface of a tooth, most commonly a bicuspid. Problems can arise when the tubercle is either worn, ground, or fractured off, resulting in pulpal exposure and possible loss of vitality of the tooth.

Dentists who perform orthodontic treatment should be aware of this dental anomaly, which occurs in at least two per cent of the Asian and Native Indian populations. Bicuspid extraction cases should involve the extraction of the anomalous premolars rather than the normal ones. In addition, the dentist should be mindful of occlusal changes that may occur during treatment or occlusal equilibration, both of which can jeopardize the vitality of teeth with DE. Pulp capping or partial pulpotomy has been postulated to be one of the most reliable forms of vital tooth treatment when pulp exposure is encountered following the sterile removal of the tubercle. When pulp exposure is not encountered, preventive resin composite sealing of the dentin or class I amalgam cavity preparation seems to be the treatment of choice.

Introduction

Dens evaginatus (DE) is characterized as a dental anomaly that consists of a super-

numerary tubercle extending from the occlusal aspect of an otherwise normal tooth.¹ Other names for this anomaly include: "composite dilated odontome, interstitial cusp, cone-shaped supernumerary cusp, occlusal enamel pearl or excrescence, tuberculated premolar, Leong's premolar, occlusal anomalous tubercle, mid-occlusal tubercle, odontome of the axial core type, and evaginated odontome."¹⁻⁵

Currently, DE is thought to be the reverse of dens invaginatus (dens in dente), and is caused by the evagination of the inner enamel epithelium into the stellate reticulum during an early stage of tooth development.^{2,5,6}

DE occurs most commonly on premolar teeth, but can also affect molars, canines and incisors.¹ It may occur unilaterally or bilaterally, and can affect one or both dental arches.^{7,8} Some controversy exists surrounding the prevalence of DE. Several authors have reported that the anomaly is most common in the mandibular first premolar,⁹ while others have found that it is most common in the mandibular second premolar.^{7,10} However, most authors agree that the anomaly occurs with greatest frequency in mandibular premolars, at a lesser frequency in maxillary premolars, and only rarely on other teeth.

It has been reported that DE can occur simultaneously with other dental anomalies such as: mesiodens,⁹ dens invaginatus,^{5,9} gemination,⁵ and supernumeraries.¹¹ DE has also been associated with lobodontia syndrome.¹²

The size and shape of the DE tubercle can vary, and has been likened to a nib, pointed cone, nipple and cylindrical spike.^{1,3,7} Most commonly, the tubercle is located between the buccal and lingual cusps of premolars and molars, usually on the buccal triangular ridge or in the central groove.^{3,7,13}

Histologically, DE is composed of a thin pulpal extension surrounded by dentin and, finally, enamel.^{1,5,6,7}

Epidemiologic studies have shown that DE occurs most commonly in people of Mongoloid origin,^{1-4,6-23} with an average incidence of approximately 2.2 per cent.^{9,24} However, it has also been reported in people of non-Mongoloid racial stock,^{2,3,7,9,12,17,22} and is known to occur among Aluits, Eskimos, and North American Indians.¹⁵ Some studies have reported that DE occurs more frequently in females,⁷ while others suggest that the anomaly is equally distributed between the sexes.⁹

Some authors have suggested that the anomaly is passed down by familial inheritance of an autosomal dominant trait,^{1,7,12,13} while others believe that there



Fig. 1 (Case One): Radiograph of the maxillary right second bicuspid following treatment with an apexification procedure. The continued apex formation (i.e., apexogenesis) revealed by the film demonstrates the success of the treatment.



Fig. 2a (Case One): An evagination is present on the occlusal aspect of the maxillary left second bicuspid.

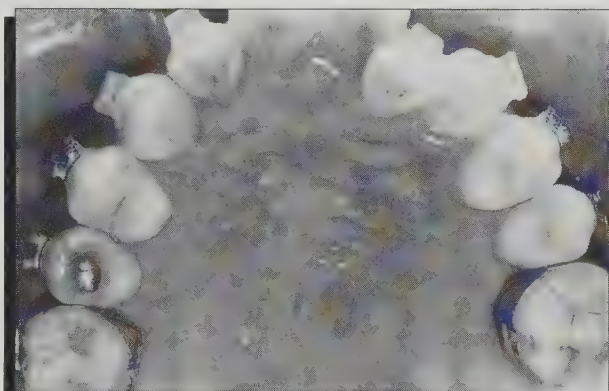


Fig. 2b (Case One): An examination of the maxillary arch located an evagination on the lingual ridge of the buccal cusp of the maxillary left second bicuspid.

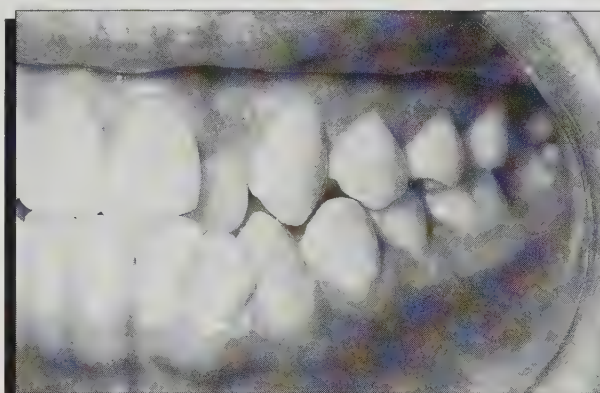


Fig. 2c (Case One): The left dentition in the intercusp position. Note the precarious position of the DE associated with the maxillary left second bicuspid.

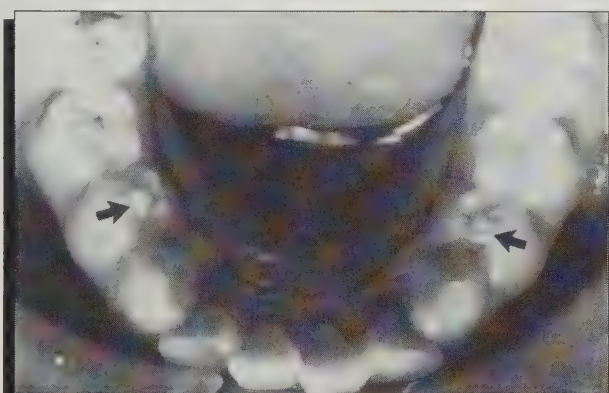


Fig. 3 (Case Two): Arrows point to the classic "target sign," which is found on many teeth with worn evaginations. The outer light ring is enamel, while the inner dark area is exposed dentin.

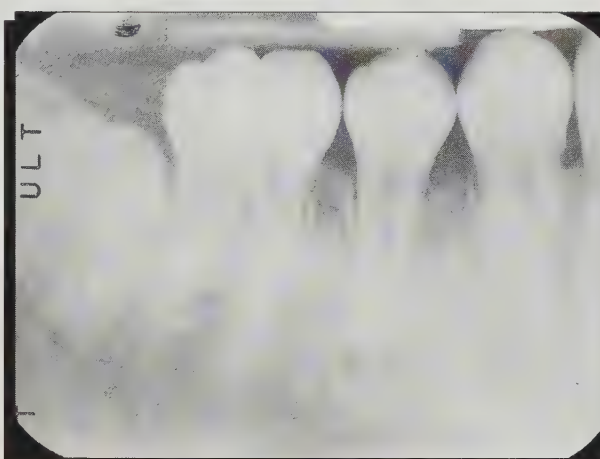


Fig. 4 (Case Three): A periapical radiograph of the mandibular right second bicuspid shows an evagination extending from the occlusal aspect of the tooth. Note the immaturity of the apex.

may be an X-linked mode of genetic inheritance.^{6,9,12,15}

Typically, when DE is diagnosed the tooth is caries free, possesses an immature root, and exhibits a tubercle large enough to cause occlusal interferences.¹¹ The tubercle is subject to wear (attrition), or may be fractured from its

base during occlusal function. This can lead to indirect or direct pulp exposure, with a resultant loss of vitality through the ingress of bacteria and their by-products.¹⁻²³

Like attrition or fracture, selective grinding of the tubercle to prevent traumatic occlusion can also result in pulpal degeneration.^{7,8,11}

Loss of vitality of a newly erupted tooth causes root maturation to be arrested when the root is only about two-thirds of its mature length.^{5,7} When this occurs, the failure to achieve physiologic root maturation complicates the endodontic treatment. Furthermore, failing to recognize pulpal degen-



Fig. 5a (Case Three): The arrow indicates the position of an evagination extending from the occlusal aspect of the mandibular right second bicuspid.

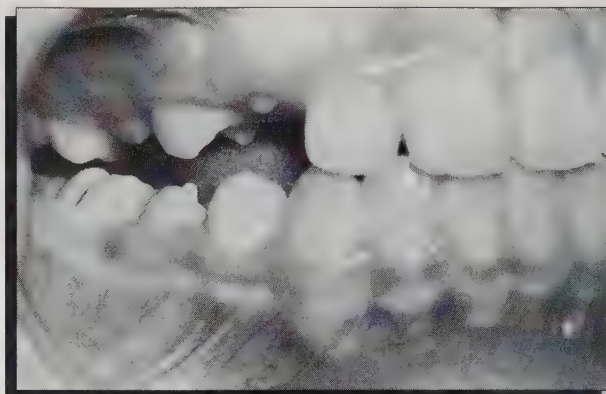


Fig. 5b (Case Three): The right dentition in the intercuspal position. Note the position of the evagination extending from the occlusal aspect of the lower right second bicuspid.

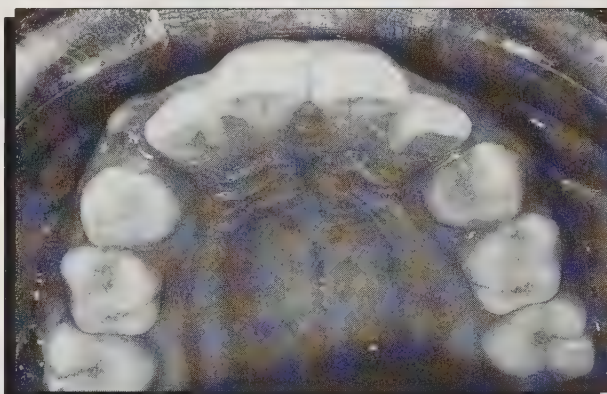


Fig. 6a (Case Four): A pretreatment occlusal view of the maxillary dentition shows severe crowding of the dental arch. Note the absence of the primary first molars and the presence of the primary second molars.

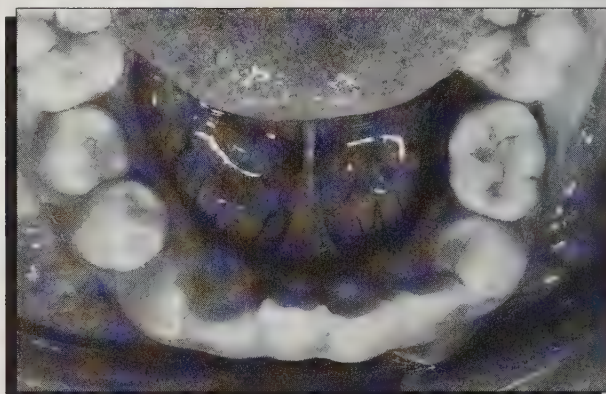


Fig. 6b (Case Four): A pretreatment occlusal view of the mandibular dentition shows severe crowding of the dental arch in the late mixed dentition.



Fig. 6c (Case Four): A pretreatment panoramic radiograph illustrating the difficulty encountered in diagnosing DE in the unerupted second premolar teeth.

eration in a Leong's premolar can lead to acute or chronic periapical inflammatory disease.³

In the past, the treatment of choice for a non-vital DE tooth was often extraction. This was primarily because of the poor prognosis for the endodontic treatment of an immature tooth.²³ Given that up to 40 per cent of teeth affected by DE will become necrotic,^{5,7,9,11} it is imperative for the clinician to recognize this anomaly during clinical and radiographic exami-

nation of the dentition. Recognition facilitates and allows appropriate treatment planning.

With the increasing Asian population in North America, the incidence of patients with DE is expected to rise. It is therefore important for dentists to recognize this dental anomaly, and understand the problems that can arise as a result of the condition. The purpose of this paper is to heighten the dental community's awareness of this anomaly, and present several cases

illustrating the impact it can have on treatment planning.

Clinical Cases

Case One

Patient J.G. was a 19-year-old female who presented for full-banded orthodontic treatment. Her pre-treatment radiographic records showed a peculiar looking maxillary right second bicuspid (**Fig. 1**). Taking the patient's history revealed that she had experienced pain in this bicuspid, which had necessitated endodontic treatment. A further review of her dental history confirmed that the endodontist had performed an apexogenesis procedure²⁵ to promote root maturation. The tooth remains asymptomatic.

Clinical examination revealed a contralateral DE associated with the maxillary left second bicuspid (**Figs. 2a, 2b and 2c**). The tooth was vital, but was in danger of losing its vitality due to fracture and/or wear of the tubercle. For this reason, the

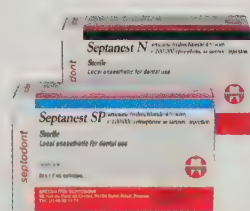
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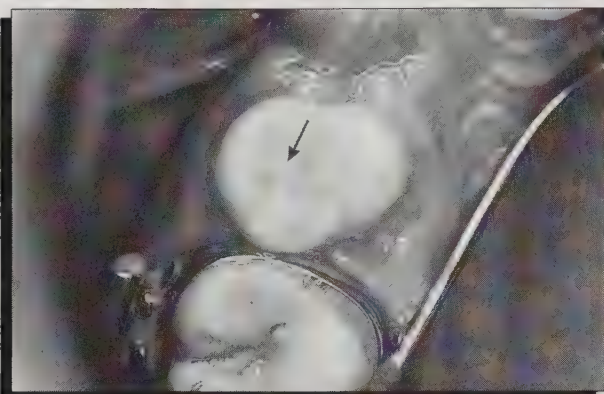


Fig. 6d (Case Four): The occlusal aspect of the erupting maxillary right second premolar. Arrows point to the target-like remnant of the evagination on the lingual aspect of the buccal cusp.

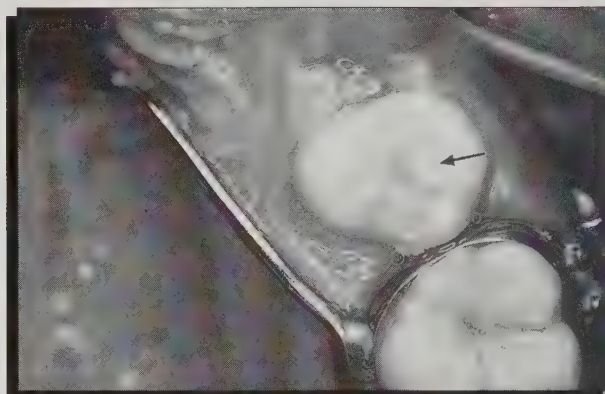


Fig. 6e (Case Four): An occlusal view of the erupting maxillary left second premolar shows an evagination (arrow) on the lingual aspect of the buccal cusp.

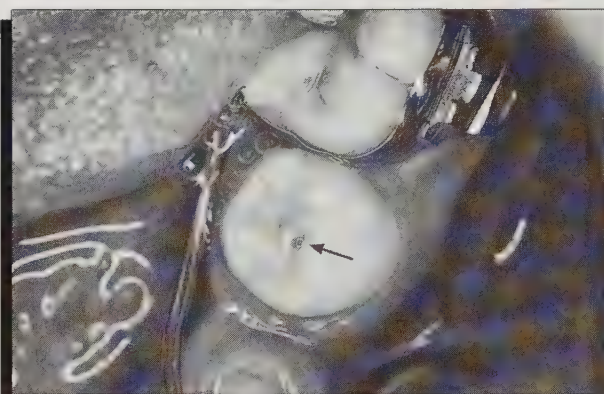


Fig. 6f (Case Four): An occlusal view of erupting mandibular left second premolar shows the remnant of an occlusal evagination (arrow).

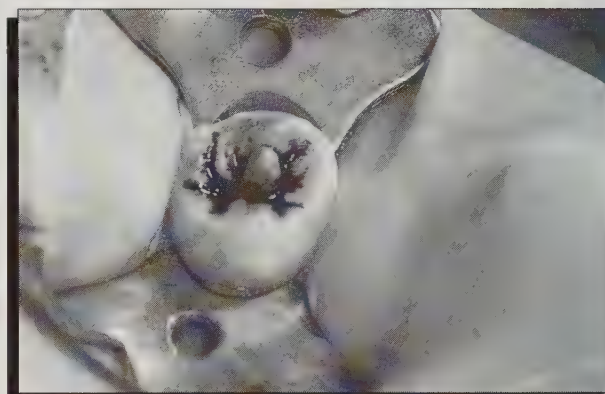


Fig. 6g (Case Four): The maxillary left second bicuspid under rubber dam prior to the removal of the evagination. Note the methylene blue dye that was applied to the occlusal surface for photographic purposes (to improve the contrast).

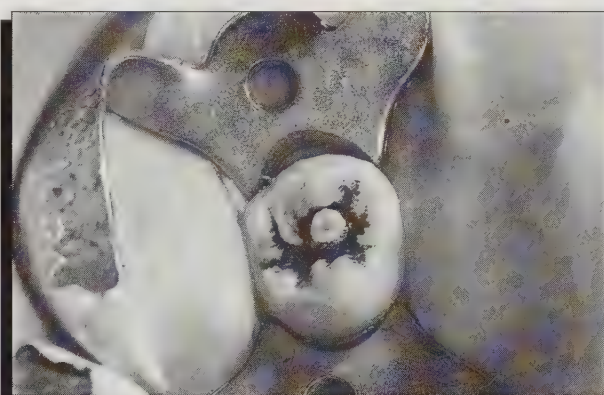


Fig. 6h (Case Four): The evagination has been removed to the level of the occlusal table, revealing the pulp horn at the central aspect of the base of the evagination.

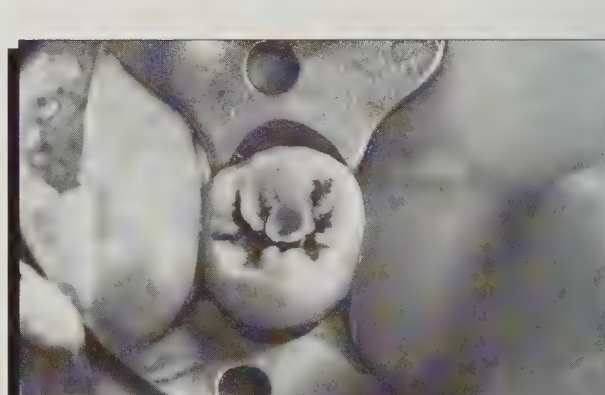


Fig. 6i (Case Four): A Cvek pulpotomy preparation, ready for application of calcium hydroxide powder.

tooth was isolated under rubber dam and the tubercle was removed aseptically under magnification. Interestingly, no pulp horn was identified, and the tooth did not require any restoration except for the placement of an occlusal sealant to cover exposed dentin.

Case Two

Patient K.C. was a 14-year-old male with asymptomatic DE of the lower first bicuspid. An occlusal

photograph (**Fig. 3**) revealed the classic "target" appearance of worn tubercles. The dark central area of the target is where the dentin was exposed by wear. The light outer ring is enamel.

In cases where the tubercle is more severely worn, or has been fractured from its base, it is sometimes possible to detect a small pit on probing with a sharp explorer. Such pit defects are considered to

represent the pulp horn of the tubercle.

Case Three

Patient M.L. was a 10-year-old female who presented with a DE tubercle on her lower right second bicuspid. A periapical radiograph of this tooth (**Fig. 4**) revealed the enamel tubercle on the occlusal surface as well as the wide open apex of the root. The tubercle of this newly erupting tooth (**Figs. 5a**

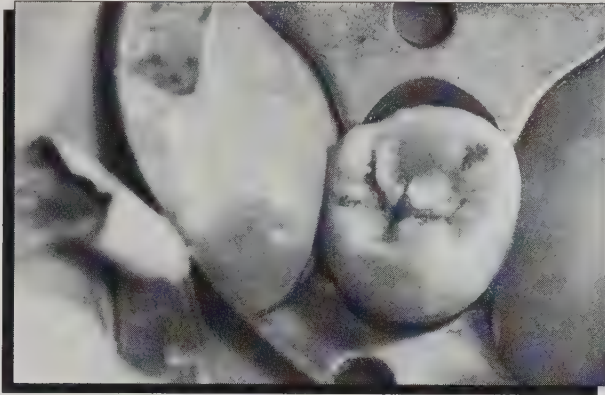


Fig. 6j (Case Four): The occlusal access opening in the maxillary left second bicuspid has been restored using amalgam.

and 5b) was at risk for fracture as the tooth continued to erupt into occlusion. Subsequent examination of the tooth revealed that the tubercle had fractured from its base within two months of completing eruption. If this tooth lost its vitality, complicated endodontic treatment would be required, and the long-term prognosis would be poorer due to the open apex and the thin walls of the root. Prophylactic treatment of the tooth was therefore undertaken following pulp testing.

The tooth was isolated under rubber dam and disinfected with 70 per cent isopropyl alcohol. A sterile #330 bur was used to remove the occlusal tubercle and complete a cavity preparation for amalgam. The preparation was approximately 2.0 mm deep. Clinical investigation revealed no pulpal bleeding. Direct pulp capping was therefore not required. All-Bond 2 (Bisco Inc., Itasca, Ill.) was employed to complete the restoration, according to the manufacturer's directions for using it with dental amalgam.

Case Four

Patient C.P. was an 11-year-old male who presented for correction of a Class I malocclusion with severe crowding in the late mixed dentition stage. Clinical and radiographic examination confirmed the need to extract the first bicuspid (Figs. 6a, 6b and 6c).

Following extraction of the four first bicuspid, a lower lingual holding arch and upper Nance appliance were fabricated to maintain the resulting space until the cuspids and second bicuspid erupted. Unfortunately, on eruption it was apparent that three of

the second bicuspid had evaginations (Figs. 6d, 6e and 6f).

As all three of the affected teeth were asymptomatic, they were treated prophylactically with Cvek calcium hydroxide pulpotomies.²⁶

The teeth were all treated in the same manner. Each tooth was first isolated with rubber dam and cleaned with isopropyl alcohol. Methylene blue dye was swabbed over the occlusal aspect of the tooth to clearly identify the evagination (Fig. 6g). The evagination was reduced to the occlusal surface using a sterile fissure bur, and the pulp horn within the evagination was visualized (Fig. 6h). A sterile #2 round bur was used to complete the conservative preparation required for the partial pulpotomy (Fig. 6i). Pressureless application of calcium hydroxide powder was performed over the pulp stump, followed by pressureless application of 0.5 mm of Temrex Base (Division of Interstate Dental Co. Inc., Freeport, N.Y.). The tooth was then acid etched and bonded using the Amalgambond system (Parkell Biomaterials Division, Farmingdale, N.Y.). An occlusal amalgam, approximately 2.0 mm thick was used to seal the access opening (Fig. 6j).

Discussion

Over the years, many recommendations have been made regarding the treatment of DE. For this reason, Su²¹ has suggested that the clinician should consider the long-term prognosis of the tooth, root length, general alignment of the teeth, and overall arch length adequacy, prior to planning definitive treatment of DE. This is particularly

important from an orthodontic perspective. If premolar extractions are planned due to arch length inadequacy, every effort should be made to prevent the extraction of a "normal tooth" if a Leong's premolar can be extracted instead.

In susceptible patient populations, careful consideration should be given to the timing of bicuspid extractions. In cases where serial extraction or early bicuspid extraction could help to speed up the orthodontic correction, the clinician must weigh the potential benefit of reduced treatment time against the potential risk of being left with defective (i.e., evaginated) teeth. This dilemma is illustrated in Case Four.

DE can occasionally be detected radiographically on unerupted teeth. A panoramic or periapical radiograph may therefore be useful for the early detection of the anomaly, and to help avoid the extraction of a healthy tooth when an evaginated tooth could be removed instead. However, since DE cannot always be detected radiographically prior to tooth eruption, the clinician may wish to delay the extraction of bicuspid until the occlusal surfaces of all bicuspid are visible clinically (recognizing that this may prolong the orthodontic treatment).

When planning orthodontic extractions from study models, the clinician should conduct a thorough clinical exam and take note of any tubercles present on the dentition prior to sending the impressions to the lab for study cast fabrication. Failure to communicate the presence of a tubercle to the lab technician may result in the tubercle being excluded from the occlusal surface of the model. Without proper warning, the lab technician is likely to mistake the tubercle for a bubble. If this occurs, the tubercle will not be present when the operator returns to the models for reference, and a "normal" premolar could be inadvertently slated for extraction.

Several alternatives have been proposed for the treatment of a vital DE.²⁷ One of the first recommended treatments involved the deliberate



grinding of the tubercle in an attempt to provoke secondary dentin formation and obliteration of the tuberculated pulp horn.²⁰ This therapy proved to be unreliable.²⁰ In fact, the grinding may have contributed to secondary infection of the pulp through exposure of dentinal tubules.^{3,8,11,13,17,20}

Other researchers have recommended the application of composite resin to support the base of the tubercle in vital cases.^{17,28-29} Occlusal adjustment of the opposing dentition in conjunction with composite application to the tubercle base has also been used.^{17,29} Due to the differential rate of wear between enamel and composite resin, this treatment may not provide adequate protection from traumatic occlusion, however, and is unlikely to satisfy patients who complain of heavy occlusion due to contact with the tubercle.²³

A more recent recommendation involves the excision of the tubercle under rubber dam, followed by indirect or direct pulp capping (or partial pulpotomy) and the placement of a class I amalgam restoration. This treatment has been advocated for the treatment of a vital tooth with an immature root.^{12,17,20,23,27}

Cvek has demonstrated the long-term success of direct pulp capping or partial pulpectomy as a treatment for vital DE.²⁶ The premise of his work is that pulp, like other bodily tissues, has the ability to heal itself. If the pulp is traumatized, whether by tubercle fracture or by mechanical removal of the tubercle, the pulp is capable of healing as long as the inflamed tissue is removed.²⁶ Following this reasoning, it might be prudent to perform partial pulpotomy therapy when an intact tubercle is observed. This type of therapy may ensure the greatest chance for the long-term vitality of the Leong's premolar.

In a study by Yong,²³ calcium hydroxide was used as a pulp capping material for the prophylactic treatment of DE involved teeth. Thirty-nine vital and asymptomatic teeth were selected for treatment. Of these, 19 received direct calci-

um hydroxide pulp capping and 20 received indirect calcium hydroxide pulp capping. Follow-up evaluations were made at one week, one month, six months and annually.

Yong found that all teeth remained vital and asymptomatic for the approximate 30 month duration of the investigation. Furthermore, it was reported that following either direct or indirect pulp capping, all evaginated teeth continued physiologic root development to the completion of apical formation. A small number of teeth showed evidence of root canal obliteration, likely due to the pressure that was applied to the pulp stump during the pulp capping procedure.

Non-vital, symptomatic immature teeth should be treated with apexification²⁵ to promote root end closure.^{4,12,17,18,21,30} Following apexification, which may take up to two years, conventional endodontic therapy should be used. Non-vital teeth with mature apices should also be treated with routine endodontic procedures.

The timing of the final obturation of the root canal is an important endodontic-orthodontic consideration, as the final endodontic filling may be delayed until the termination of orthodontic treatment to prevent the clinical impression of "overfilling." This occurs due to apical root resorption during orthodontic tooth movement. If final obturation is delayed, the root canal may be filled with calcium hydroxide for the duration of active orthodontic treatment.

The long-term prognosis of the DE tooth depends on early clinical diagnosis and a multi-disciplinary approach to treatment.²⁸⁻³⁰ Management of the anomaly should be initiated as soon as possible after it is diagnosed, and certainly prior to beginning active orthodontic tooth movement. It is important to plan the treatment of the evagination carefully to avoid an unexpected loss of tooth vitality during orthodontic therapy.

Conclusions

- DE manifests itself as an innocuous looking tubercle of

enamel. It occurs in approximately 2.2 per cent of susceptible populations, primarily on premolar teeth.

- Treatment success depends on early diagnosis and multidisciplinary treatment.
- The treatment of vital DE cases should include aseptic removal of the tubercle. When the pulp is not exposed, this should be followed by preventive resin restoration. If the pulpal tissue is exposed, pulp-capping/partial pulpotomy (according to Cvek) should be employed.
- The treatment of non-vital DE cases should focus on promoting root end closure (apexification). If the patient's arch length dictates extraction, however, and orthodontic treatment is planned, it is preferable to extract the DE tooth.
- Occlusal equilibration of the tubercle should be undertaken with caution due to the potential for pulp exposure, especially in immature teeth.

Acknowledgments: The authors thank Dr. Colin Price, professor and chairman, division of oral radiology, faculty of dentistry, University of British Columbia, for providing the intellectual stimulation that sparked this study; and the department of biomedical communications at the University of British Columbia for its help in the reproduction of our slides; and Dr. David Nerman for Fig. 1.

An abbreviated version of this paper has recently been accepted for publication in the *American Journal of Orthodontics*.

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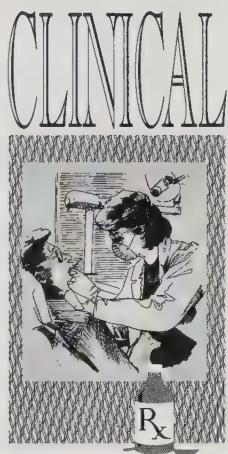
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Revised American Heart Association Guidelines For the Prevention Of Bacterial Endocarditis: Highlights Of Specific Changes For the Dental Profession

George K.B. Sàndor, MD, DDS, FRCD(C), FRCS(C), FACS
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Jerry S. Vasilakos, DDS

In the June 1997 issue of the *Journal of the American Medical Association*,¹ the American Heart Association (AHA) published revised guidelines for the prevention of bacterial endocarditis. These guidelines had previously been revised in 1990.^{2,3} AHA's latest revisions are based on evidence-based recommendations which were formulated following an analysis of the relevant literature pertaining to procedure-related endocarditis. The guidelines have now been changed to more clearly define when prophylaxis should be recommended, improve practitioner and patient compliance, reduce cost and the potential for adverse gastrointestinal effects, and approach a more uniform, world-wide set of recommendations.

Although AHA has provided its guidelines as a protocol for the prevention of subacute bacterial endocarditis (SBE), it has done so with the proviso that they should not be viewed as a standard of care or as a substitute for clinical judgment.¹ However, the prophylaxis of SBE in patients deemed at risk is clearly considered as a standard of care by many institutions, even though no randomized and carefully controlled human trials have been done to definitely establish that antibiotic prophylaxis provides protection against endocarditis.

Table I *Revised American Heart Association Guidelines For the Prevention of Bacterial Endocarditis*

Endocarditis Prophylaxis Recommended

High Risk Category
Old prosthetic valves
Previous history of bacterial endocarditis
Complex cyanotic congenital heart disease (e.g., single ventricle states, transposition of the great vessels, tetralogy of Fallot)
Surgically constructed systemic pulmonary shunts or conduits
Moderate Risk Category
Most other congenital cardiac malformations (other than above and below)
Acquired valvular dysfunction (e.g., rheumatic heart disease)
Hypertrophic cardiomyopathy
Mitral valve prolapse with valvular regurgitation and/or thickened leaflets
Negligible Risk Category/Endocarditis Prophylaxis Not Recommended
Bacterial endocarditis poses no greater risk in this category than in the general population).
Isolated secundum atrial septal defect
Surgical repair of atrial septal defect, ventricular septal defect or patent ductus arteriosus (without residua beyond six months)
Previous coronary artery bypass graft surgery
Mitral valve prolapse without valvular regurgitation
Physiologic, functional or innocent heart murmurs
Previous Kawasaki disease without valvular dysfunction
Previous rheumatic fever without valvular dysfunction
Cardiac pacemakers and implanted defibrillators

Adapted from JAMA 277:1795, June 1997

Dalacin® C capsules

(clindamycin hydrochloride)

Antibiotic

ACTION AND CLINICAL PHARMACOLOGY

Clindamycin exerts its antibacterial effect by causing cessation of protein synthesis and also causing a reduction in the rate of synthesis of nucleic acids.

Absorption

Clindamycin is rapidly and almost completely absorbed from the gastrointestinal tract in man and peak serum levels are seen in about 45 minutes. The average peak serum level following a single 150 mg dose in adults is 2.74 mcg/mL. Therapeutically effective average levels at 6 hours after a 150 mg dose of 0.73 mcg/mL are found.

The absorption of clindamycin is not appreciably affected by food intake. Peak serum levels following a single 250 mg oral dose of clindamycin with the patient in the fasting state were 3.1 mcg/mL at 45 minutes whereas the same dose administered with food gave a peak level of 2.4 mcg/mL. A 250 mg dose administered one hour after food gave a peak level of 2.8 mcg/mL but this peak did not occur until two hours after administration of the medication. A 250 mg dose with the patient in a fasting state and with food administered one hour after the medication resulted in peak levels of 3.1 mcg/mL at 1 1/2 hours.

Excretion

The 48 hour urinary excretion of clindamycin in adults following a single dose of 150 mg represented 10.9% of the administered dose (range 4.8% to 12.8%). These measurements were made by bio-assay and both the percent recovered and the urinary concentration are quite variable. The urinary concentration following a single 50 mg dose of clindamycin in the first 24 hours ranged from 8 to 25 mcg/mL of urine.

Fecal excretion of clindamycin has also been determined. Patients on a three week study when administered 1 gram of clindamycin per day had an average of 283 mcg/gm of stool. Patients on lincomycin 2 grams per day under the same conditions showed 3980 mcg/gm of stool. In single dose studies following administration of 250 mg of clindamycin, only 2.7% of the dose was excreted in the feces in 48-96 hours.

Tissue Penetration

In three patients following the administration of 150 mg of clindamycin serum levels reached 2.25 mcg/mL in 2 hours and declined to 1.5 mcg/mL at 4 hours. During this period antibiotic synovial fluid levels were 1 mcg/mL at 2 hours and remained unchanged for the next and last 2 hours of observation .

Various other body fluids and tissues were also assayed for clindamycin and the results of these assays and serum levels at the same time are recorded in Table 1.

TABLE I				
Specimen	No. of Specimens	Average Serum Level	Average Fluid Level mcg/mL	Tissue Level mcg/g
Pancreatic fluid (C6-264)	4	1.15	45.1	
Bile (C6-264)	19	3.35	52.45	
Gall Bladder (C6- 24)	16	0.81		4.33
Liver (C6-265)	1	42.35		3.80
Kidney (C6-265)	1	1.50		9.07
Bone (C4-390)	2	2.44		9.91

INDICATIONS AND CLINICAL USE

Dalacin C (clindamycin hydrochloride) is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *bacteroides* species, *peptostreptococcus*, anaerobic streptococci, *clostridium* species and microaerophilic streptococci.

Dalacin C is also indicated in serious infections due to sensitive gram-positive organisms (staphylococci, including penicillinase-producing staphylococci, streptococci and pneumococci) when the patient is intolerant of, or the organism resistant to other appropriate antibiotics.

DALACIN C is indicated for prophylaxis against alpha-hemolytic (viridans group) Streptococci before dental, oral and upper respiratory tract surgery.

- a) The prophylaxis of bacterial endocarditis in patients allergic to penicillin with any of the following conditions: congenital cardiac malformations, rheumatic and other acquired valvular dysfunction, prosthetic heart valves, previous history of bacterial endocarditis, hypertrophic cardiomyopathy, surgically constructed systemic-pulmonary shunts, mitral valve prolapse with valvular regurgitation or mitral valve prolapse without regurgitation but associated with thickening and/or redundancy of the valve leaflets.
- b) Patients taking oral penicillin for prevention or recurrence of rheumatic fever should be given another agent such as clindamycin, for prevention of bacterial endocarditis.

CONTRAINDICATIONS

As with all drugs, the use of Dalacin C (clindamycin hydrochloride) is contraindicated in patients previously found to be hypersensitive to this compound. Although cross-sensitization with Lincocin® (lincomycin hydrochloride) has not been demonstrated, it is recommended that Dalacin C not be used in patients who have demonstrated lincomycin sensitivity.

Until further clinical experience is obtained Dalacin C is not indicated in the newborn (infants below 30 days of age), or in pregnant women.

WARNINGS

Some cases of severe and persistent diarrhea have been reported during or after therapy with Dalacin C (clindamycin hydrochloride). This diarrhea has been occasionally associated with blood and mucus in the stools and has at times resulted in acute colitis. When endoscopy has been performed, some of these cases have shown pseudomembrane formation.

If significant diarrhea occurs during therapy, this drug should be discontinued or, if necessary, continued only with close observation. Significant diarrhea occurring up to several weeks post-therapy should be managed as if antibiotic-associated.

If colitis is suspected, endoscopy is recommended. Mild cases showing minimal mucosal changes may respond to simple drug discontinuance. Moderate to severe cases, including those showing ulceration or pseudomembrane formation should be managed with fluid,

electrolyte, and protein supplementation as indicated. Corticoid retention enemas and systemic corticoids may be of help in persistent cases, anticholinergic and antiperistaltic agents may worsen the condition. Other causes of colitis should be considered .

Studies indicate a toxin(s) produced by *Clostridia* (especially *Clostridium difficile*) may be a principal cause of clindamycin and other antibiotic-associated colitis. These studies also indicate that this toxigenic *Clostridium* is usually sensitive *in vitro* to vancomycin. When 125 mg to 500 mg of vancomycin were administered orally four times a day for 5 - 10 or more days, there was a rapid observed disappearance of the toxin from fecal samples and a coincidental recovery from the diarrhea.

It should be noted that serious relapses have occurred up to one month after apparently successful treatment. A relatively prolonged period of continuing observation is therefore recommended.

PRECAUTIONS

Dalacin C (clindamycin hydrochloride) like any drug, should be prescribed with caution in atopic individuals.

The use of antibiotics occasionally results in overgrowth of non-susceptible organisms – particularly yeasts. Should super-infections occur, appropriate measures should be taken as dictated by the clinical situation.

As with all antibiotics, perform culture and sensitivity studies in conjunction with drug therapy.

Since abnormalities of liver function tests have been noted occasionally in animals and man, periodic liver function tests should be performed during prolonged therapy. Blood counts should also be monitored during extended therapy.

Dalacin C may be used in anuretic patients. Since the serum half-life of clindamycin in patients with impaired hepatic function is greater than that found in normal patients, the dose of Dalacin C should be appropriately decreased. Hemodialysis and peritoneal dialysis are not effective means of removing the compound from the blood. Periodic serum levels should be determined in patients with severe hepatic and renal insufficiency.

ADVERSE REACTIONS

Only 65 of the 851 patients treated for infections developed side effects representing 7.6% of the total study group or 8.0% of the 813 patients with follow-up. Only 22 of these patients' symptoms were considered due to Dalacin C (clindamycin hydrochloride) for an incidence of 2.7% among the 813 cases with follow-up.

Gastrointestinal: Abdominal pain occurred in 12 patients for an overall incidence of 1.4% in 851 patients and was considered drug related in 7 (0.8%).

Diarrhea occurred in 22 cases for an overall incidence of 2.6% and was drug related in 13 (1.5%). Vomiting occurred in 14 cases with an overall incidence of 1.6%. Seven patients (0.8%) had nausea which was drug related in 2 cases (0.2%). Side effects were severe in 10 instances. (See also under "WARNINGS"). Esophagitis, at times severe, has been reported.

Hemopoietic: Transient neutropenia (leukopenia) has been reported. Its relationship to therapy is unknown. No irreversible hematologic toxicity has been reported.

Skin and Mucous Membranes: Skin rashes have been reported in 6 patients (0.7%), none of which could be determined as drug related. One case of urticaria was reported but its relationship to drug therapy could not be determined.

Liver: Although no direct relationship of Dalacin C to liver dysfunction has been noted, transient abnormalities in liver function tests (elevations of alkaline phosphatase and serum transaminase) have been observed in a few instances.

SYMPTOMS AND TREATMENT OF OVERDOSAGE

No cases of overdosage have been reported. It would be expected however, that should overdosage occur, gastrointestinal side effects including abdominal pain, nausea, vomiting and diarrhea might be seen. During clinical trials one 3-year old child was given 100 mg/kg of Dalacin C (clindamycin hydrochloride) for five days and showed mild abdominal pain and diarrhea. One 13-year old patient was given 75 mg/kg for five days with no side effects. In both cases laboratory values remained normal.

Overdosage should be treated with simple gastric lavage. No specific antidote is known.

DOSAGE AND ADMINISTRATION

Adults: 150 mg every 6 hours.

Moderately severe infections: 300 mg every 6 hours.

Severe infections: 450 mg every 6 hours.

Children (over one month of age) :

One of the following two dosage ranges should be selected depending on the severity of the infection:

- 8-16 mg/kg/day (4-8 mg/lb/day) divided into 3 or 4 equal doses.
- 16-20 mg/kg/day (8-10 mg/lb/day) divided into 3 or 4 equal doses.

Absorption of Dalacin C (clindamycin hydrochloride) is not appreciably modified by ingestion of food and may be taken with meals.

To avoid the possibility of esophageal irritation, Dalacin C capsules should be taken with a full glass of water.

For prevention of endocarditis: Adults: 300 mg orally 1 hour before procedure; then 150 mg 6 hours after initial dose. **Children:** 10 mg/kg (not to exceed adult dose) orally 1 hour before procedure; then 5 mg/kg 6 hours after initial dose.

Note: With β -hemolytic streptococcal infections, treatment should continue for at least 10 days to diminish the likelihood of subsequent rheumatic fever or glomerulonephritis.

AVAILABILITY OF DOSAGE FORMS

Each capsule contains clindamycin hydrochloride hydrate equivalent to 150 mg or 300 mg clindamycin base. Supplied in bottles of 100 and 500 capsules.

Further product information available on request. 17/08/95

- References :
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Table II

Dental Procedures For Which Endocarditis Prophylaxis May Be Recommended*

Dental extractions
Periodontal procedures including surgery, scaling and root planing, probing and recall maintenance
Dental implant placement and reimplantation of avulsed teeth
Endodontic (root canal) instrumentation beyond the apex or surgery
Subgingival placement of antibiotic fibres or strips, placement of retraction cord
Initial placement of orthodontic bands but not brackets
Intraligamentary local anesthetic injections
Prophylactic cleaning of teeth or dental implants where bleeding is anticipated

* Prophylaxis is recommended for those patients with high and moderate risk cardiac conditions, described in Table I.

Adapted from JAMA 277:1797, June 1997

Table III

New AHA Guidelines For Prophylactic Antibiotic Coverage In Conjunction With Dental, Oral, Respiratory Tract Or Esophageal Procedures

Situation	Agent	Regimen
Standard general prophylaxis	Amoxicillin	Adults: 2.0 g; children: 50 mg/kg up to 2.0 g orally 1 hr before procedure
Inability to take oral medications	Ampicillin	Adults: 2.0 g IM or IV; children: 50 mg/kg IM or IV 30 min before procedure
Penicillin allergy	Clindamycin	Adults: 600 mg; children: 20 mg/kg orally 1 hr before procedure
	Cephalexin or Cefadroxil	Adults: 2.0 g; children: 50 mg/kg orally 1 hr before procedure
	Azithromycin or Clarithromycin	Adults: 500 mg; children: 15 mg/kg orally 1 hr before procedure
Penicillin allergy and inability to take oral medications	Clindamycin or	Adults: 600 mg; children: 20 mg/kg IV 30 min before procedure
	Cefazolin	Adults: 1.0 g; children: 25 mg/kg IM or IV 30 min before procedure

Adapted from JAMA 277:1799, June 1997

Patients At Risk

AHA clearly delineates three risk categories for endocarditis: high, moderate or negligible. Prophylaxis against SBE is recommended for the high and moderate risk groups, but not for the negligible risk group. The conditions that warrant inclusion in either the high, moderate, or negligible risk categories are listed in **Table I**.

Dental Procedures

AHA has also delineated several dental procedures that should only be provided to patients at high and moderate risk for endocarditis in conjunction with prophylaxis against bacterial endocarditis (**Table II**). It also recommends administering 15 cc of chlorhexidine hydrochloride mouth rinse to these patients for 30 seconds⁴ prior to dental treatment.

The guidelines also address the problem of repetitive antibiotic exposures in patients requiring a series of dental procedures. In such situations, it may be prudent to allow nine to 14 days between procedures to reduce the potential for resistant organisms to emerge, and to allow the mouth to be repopulated with susceptible flora.^{5,6} If possible, a combination of procedures should be planned in the same period of antibiotic prophylaxis.

Table II lists the placement of dental implants as a procedure requiring prophylaxis. The authors take exception to this recommendation, and respectfully point out that the long-term safety of using osseointegrated dental implants for patients susceptible to bacterial endocarditis has never been established. Fixture loosening, abutment and cover screw mobility, and superstructure fracture could all contribute to bacteremia following dental implant placement. The policies of the dental departments of the Hospital for Sick Children, the Bloorview MacMillan Centre, and The Toronto Hospital, where cardiac patients are treated, are not to place dental implants in patients at risk for bacterial endocarditis. Admittedly, however, the incidence of bacteremia in these patients is unknown.

Specific Antibiotic Regimens

AHA's current recommendations on antibiotic use are outlined in **Table III**. Some of the changes to the guidelines reflect a trend that was established in 1990. Once again, amoxicillin is the agent of choice for general prophylaxis. Although amoxicillin, ampicillin and penicillin-V are all equally effective *in vitro* against α -hemolytic streptococci, amoxicillin is recommended because it is better absorbed from the gastrointestinal tract and provides more sustained serum levels. However, instead of recommending that 3.0 g of amoxicillin be administered one hour prior to treatment, followed six hours later by a 1.5 g dose, AHA now believes that the administration of a single 2.0 g dose will result in fewer gastrointestinal side effects and produce adequate serum levels.⁷ The single 2.0 g dose produces amoxicillin serum levels above the minimum inhibitory concentration required for most oral streptococci for six to 14 hours.⁸ Therefore, the second dose is no longer recommended.

Clindamycin has replaced erythromycin as the primary agent recommended for use in penicillin-allergic patients, and is preferable to its alternatives, cephalosporins or macrolides (**Table III**). Like amoxicillin, these antibiotics do not require a follow-up dose six hours after their initial administration.

Finally, it is now considered prudent to select a new drug from a different class of antibiotics rather than merely increase the dose of an antibiotic that a patient is already taking.

This summary is intended as a guide to help keep the dental profession in Canada informed of AHA's new recommendations for SBE prophylaxis. ■

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RESEARCH



Prevalence Of Dental Caries and Fluorosis In Seven- to 12-Year-Old Children In Northern Newfoundland and Forteau, Labrador

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ABSTRACT

In 1993, a cross-sectional oral health survey of 739 randomly selected seven- to 12-year-old Canadian school children was conducted in Forteau (Labrador), Roddickton (northern Newfoundland), and Flower's Cove (northern Newfoundland) to determine the prevalence of dental caries and fluorosis. Children in grades two through six ($n = 838$) were selected to participate in the survey, which achieved a response rate of 88.2 per cent. Caries prevalence was estimated using modified World Health Organization (WHO) criteria (non-cavitated carious pits and fissures were coded separately from cavitated carious lesions). Fluorosis was measured using the Tooth Surface Index of Fluorosis (TSIF). In-school examinations were carried out by three dentists using portable equipment. There was a significantly higher percentage of caries-free children in Forteau (17.6 per cent) than in Roddickton (7.1 per cent) or Flower's Cove (8.3 per cent). Less than 20 per cent of the children surveyed in all regions had fluorosis. When fluorosis was present, it was mostly of the "very mild" type. Children from Forteau had a signif-

icantly lower mean number of decayed permanent teeth than children from the two other regions (1.6 in Forteau, versus 2.7 in Roddickton and 3.4 in Flower's Cove). The mean number of sealed teeth was significantly higher in Forteau children (mean = 1.1) compared with children from Roddickton (mean = 0.3) and Flower's Cove (mean = 0.03). In Forteau children, the F/DMFS2 (non-cavitated carious lesions excluded) ratio was 57 per cent, compared to a ratio of 29 per cent in children from Roddickton and 25 per cent in children from Flower's Cove. Similarly, the mean number of non-cavitated carious pits and fissures were higher than cavitated tooth surfaces by a ratio of 1.5 to 1. The risk markers significantly associated with lower DMFS scores were the number of sealants, lower grade level, college or university education of parents, and residence in Forteau. However, dental caries is endemic in the region and there is a clear need for an accessible school- and community-based oral health promotion and treatment program. In conclusion, this survey found that sealants are effective in preventing dental caries.

Key Words: caries prevalence, fluorosis, sealants, epidemiology

Introduction

When this survey was conducted in 1993, Grenfell Regional Health Services (GRHS) provided medical and dental care to the population of Labrador (excluding Labrador City and Wabush, where it is only responsible for providing nursing services) and northern Newfoundland. This region of Canada is mostly dependent on both the in- and off-shore fishery. It has experienced a severe economic decline since the early 1990s, when a moratorium was imposed on fishing for Atlantic cod and other fish species. These economic changes could have a detrimental effect on the oral health status of children.

All children in Newfoundland, from birth until their 13th birthday, are covered by a universal, publicly financed dental care program. The program covers diagnosis, prevention (excluding sealants), restorations, pulp therapy, and oral surgery. In northern Newfoundland, dental care is provided in community-based dental clinics. Operated by GRHS, these clinics are either staffed by full-time dentists (Roddickton and Flower's Cove) or by dentists who visit on a regular basis (Forteau) to provide dental care.

There are no recent data on the oral health status of children in northern Newfoundland and southern Labrador. The last survey was carried out in 1984.¹ It found that the average DMFT of 12-year-old children was 2.7 in Flower's Cove, 2.8 in Roddickton, and 3.8 in the south of Labrador (Forteau region). The average deft scores in seven-year-old children were 4.8 in Roddickton, 2.2 in Flower's Cove, and 6.2 in the Forteau region.¹

Our 1993 survey was conducted to evaluate the dental health status of school children in Forteau, Roddickton and Flower's Cove. The three communities are situated in northern Newfoundland (Roddickton and Flower's Cove) and southern Labrador (Forteau). They were selected for study by the former Chief of Dental Services, GRHS, because they included populations with similar histories of access to dental care.

Methods

Sample

Forteau is situated on the southeastern tip of Labrador, across the Gulf of St. Lawrence from northern Newfoundland, and bordering Blanc Sablon, Quebec. Roddickton is on the east coast of Newfoundland's northern peninsula, while Flower's Cove is on its west coast. Several smaller communities in each region were also included in this survey.

All children in grades two through six were selected for inclusion in the survey. The intent was to study a sample of children who had participated for at least two years in Newfoundland and Labrador's school-based fluoride tablet chewing program. In each of the selected regions, the population were predominantly of European origins, and the main occupation was fishing and fish processing.

The parents of eligible children received a letter describing the study, a consent form, and a questionnaire. In addition to requesting information on the children's residence history, use of fluoride supplements and toothpastes, participation in the fluoride programs at schools, and feeding habits during the first two years of life, the ques-

tionnaire asked parents to answer questions regarding their own level of education as well as other demographic variables. The questionnaire used in this survey had been used and tested in a previous survey conducted by the researchers.²

Local coordinators were hired to organize the study in each region. The coordinators also contacted the parents, when required, and answered any questions they had about the survey.

Data obtained from a Health Canada publication, "Fluoridation in Canada as of December 31, 1986,"³ was used to code the fluoridation status of all the communities where the children had lived between birth and their seventh birthday.

Oral Conditions

The survey examinations were carried out by two GRHS dentists and one external examiner using portable dental equipment, including an A-dec chair and fibre-optic lights. All children were examined for the presence of fluorosis and caries. Prior to being examined for the presence of caries, the children's teeth were dried with gauze.

Dental caries was diagnosed using WHO criteria,⁴ with one modification (a separate code was assigned for non-cavitated carious pits and fissures). All non-cavitated carious pits and fissures were diagnosed in the same way: After cleaning and drying the tooth, the examiner visually checked whether the tooth surface was cavitated (loss of enamel). If the tooth surface was not cavitated, and if the pits or fissures were colored light or dark brown at their base, and/or if a white change (demineralization) in the sides of the pits or fissures was detected, then the area was diagnosed as a non-cavitated carious area. These lesions had a leathery or tacky feel on gentle exploring (scratching with the explorer). Stained pits and fissures (black stained pits and fissures) were coded as sound.⁵

Only gentle exploring was used during the survey examinations. Examiners were instructed (and trained) to check the surface

characteristics of the teeth without penetrating the carious lesions.

Dental fluorosis was measured using the TSIF.⁶ The facial surfaces of all permanent teeth, excluding third molars, were scored.

Following training and a review of the survey criteria, the three examiners conducted reliability assessments by examining two half arches of selected students. The intra-examiner reliability coefficients (kappa) ($n = 35$ children with 2,240 tooth surfaces) for the three examiners were between 0.66 (examiner 2) and 0.91 (examiner 1), and the range of inter-examiner reliability coefficients ($n = 11$ children with 704 tooth surfaces) were between 0.60 (examiner 2 versus 3) and 0.78 (examiner 1 versus 2).

Statistical Analysis

Data obtained from the clinical examinations and completed questionnaires were entered in a database created exclusively for this project. All descriptive analyses were conducted using ANOVA and chi-square tests (SPSS PC). A comparison of group means was done using the Tukey's multiple range test to account for multiple comparison effects.

After bivariate analysis, several regression models were developed to account for the confounding effects of gender, grade, region of residence, use of fluoridated water during the first six years of life, exposure to fluoridated toothpastes, and the presence of sealants.

In the regression analysis, PC CARP (Statistical Laboratory and the Department of Statistics, Iowa State University, Ames, Iowa) was used to adjust for the clustering of dental caries within schools. Similarly, schools were used as the sampling error computation units in the clustered analysis.

The best fitting model was found when the square root of DMFS1 (non-cavitated, cavitated, filled and missing due to caries) scores was used as the dependent variable. The design effect for the DMFS1 score was 3.1, suggesting that a failure to account for clustering of dental caries scores of children in the same school could

Table I

Number Of Children Examined In Forteau, Roddickton and Flower's Cove, Newfoundland, 1993

Region	n	Examined	Average age (years)
Forteau	175	153	9.4
Roddickton	292	238	9.4
Flower's Cove	371	348	9.5
Total	838	739	9.5

Table II

Percentage Of Children By Exposure To Fluoridated Water, Use Of Fluoridated Toothpastes and Education Status Of Family By Region Of Residence, 1993

	Forteau	Roddickton	Flower's Cove
Type of water used during the first six years of life			
Non-fluoridated	80.4	91.6	85.6
Fluoridated	—	0.4	1.1
Mixed	19.6	8.0	13.2
Fluoridated toothpaste use of child			
< 1 year old	36.6	29.6	36.4
1 to 2 years old	75.2	69.7	68.6
2 to 3 years old	92.4	84.9	87.6
3 to 4 years old	96.6	92.7	94.5
4 to 5 years old	98.0	98.2	97.2
5 to 6 years old	98.0	98.3	97.9
Highest education (household)			
Elementary only	46.0	37.7	36.3
High school	32.7	39.2	41.5
College	11.3	9.9	12.3
University	10.0	13.2	9.8

have resulted in erroneous conclusions (increased Type I error).

Results

Background Information

There were no differences among the three regions with respect to the age distributions of the students examined in this study. The average age of the students ex-

amined was 9.5 years (range seven to 12 years). **Table I** presents the distribution of the 739 children examined by location. The overall response rate among all eligible school children was 88.2 per cent.

The majority of the children (about 80 per cent) were born and lived in non-fluoridated commu-

nities (**Table II**) for at least the first six years of their life. Forteau had a significantly higher proportion of children who lived some of the first six years of their lives in a fluoridated community (19.6 per cent versus 8.0 per cent (Roddickton) and 13.2 per cent (Flower's Cove)) (**Table II**). Only five of the 739 children examined had lived all of their first six years of life in fluoridated communities.

Use of toothpaste was ubiquitous in all three areas (about 98 per cent) by the age of five or six years of life (**Table II**). Only one-third of the parents reported brushing their children's teeth before the age of one year (**Table II**). Overall, two-thirds of the parents in this study had completed no more than elementary or high school education. About 90 per cent of the children had participated in a school fluoride program for at least two consecutive years.

Dental Caries Prevalence

There were significant differences in the prevalence of caries-free children (no active or past caries, fillings or missing teeth) among the three areas (**Table III**). Forteau had the highest percentage (17.6 per cent) of children who were caries-free (including non-cavitated carious lesions) in the primary (decayed and filled only) and permanent dentitions. There were no statistically significant differences in the prevalence of caries-free children between Flower's Cove and Roddickton. The prevalence of caries-free children increased to 22.2 per cent, 15.5 per cent, and 11.2 per cent, in Forteau, Roddickton and Flower's Cove, respectively, when non-cavitated carious pits and fissures were excluded.

Children from Forteau had a significantly lower mean number of decayed, missing and filled tooth surfaces (DMFS) in the permanent dentition than children from Flower's Cove and Roddickton (**Table IV**). The mean number of non-cavitated carious tooth surfaces was also significantly lower in Forteau's children (mean = 1.0) than in children from the other two regions (mean = 1.7 – 2.0).

Table III

Percentage Of Children By Caries-Free, Fluorosis Status and Region Of Residence In 1993

Variable	Forteau	Roddickton	Flower's Cove	P-value
Per cent caries-free ¹	17.6	7.1	8.3	0.001
Per cent caries-free ²	22.2	15.5	11.2	0.006
DMFS1 ² = 0	39.2	21.4	21.6	0.000
DMFS2 ² = 0	58.2	47.1	48.0	0.07
Fluorosis (1+) ³	13.7	18.2	19.7	0.28
Fluorosis (2+) ³	2.0	8.0	5.2	0.03

¹ Caries-free = no evidence of past or present dental caries in the permanent and primary dentitions.

Caries-free1: non-cavitated carious lesions were included.

Caries-free2: non-cavitated carious lesions were excluded.

² DMFS = 0 = no evidence of past or present dental caries in the permanent dentition.

DMFS1: non-cavitated carious lesions were included.

DMFS2: non-cavitated carious lesions were excluded.

³ Fluorosis (1+): TSIF (6) score of 1 was included.

Fluorosis (2+): TSIF (6) score of 1 was excluded.

Table IV

Mean Number Of Decayed and Filled Primary Teeth (dft Teeth), and Decayed, Missing, Filled and Sealed Permanent Tooth Surfaces By Region Of Residence

Variable	Forteau	Roddickton	Flower's Cove	P-value
dft primary	1.6	2.1	2.3	0.007
Decayed				
a. Non-cavitated PF ¹	1.0	1.7	2.0	0.000
b. Cavitated (all surfaces)	0.6	1.0	1.4	0.000
Missing	0.06	0.2	0.09	0.13
Filled				
a. With decay	0.2	0.02	0.07	0.31
b. No decay	0.6	0.5	0.4	0.21
Sealants	1.1	0.3	0.03	0.000
DMFS1 ²	2.4	3.5	3.9	0.000
DMFS2 ³	1.4	1.8	1.9	0.21
DMFT1 ²	1.5	2.5	2.7	0.000
DMFT2 ³	0.9	1.3	1.3	0.03

¹ Pits and fissures.

² Non-cavitated carious lesions were included.

³ Non-cavitated carious lesions were excluded.

Conversely, the mean number of cavitated tooth surfaces was significantly higher in children from Flower's Cove compared to children from Forteau. No significant difference in the mean number of cavitated tooth surfaces was found

between the children from Flower's Cove and Roddickton. The mean number of non-cavitated carious pits and fissures was higher than the mean number of cavitated carious tooth surfaces by a ratio of about 1.5 to 1.

There was no significant difference in the mean number of filled tooth surfaces among the children from the three areas (Table IV). The mean number of sealed tooth surfaces was significantly higher in the Forteau children (mean = 1.1)

Table V

Mean Number Of Decayed and Filled Primary Teeth (dft Teeth), and Decayed, Missing, Filled and Sealed Permanent Tooth Surfaces By Age

Variable	Age						P-value
	7	8	9	10	11	12	
dft primary	3.5	3.0	2.9	1.7	1.0	0.3	<0.001
Decayed							
a. Non-cavitated PF ¹	1.1	1.3	1.7	1.8	2.0	2.0	<0.001
b. Cavitated (all surfaces)	0.4	0.4	0.9	1.5	1.5	2.1	<0.001
Missing	0.06	0.04	0.04	0.2	0.05	0.7	<0.001
Filled							
a. With decay	—	—	0.1	0.2	—	0.05	0.37
b. No decay	0.07	0.09	0.4	0.7	0.6	1.0	<0.001
Sealants	0.1	0.4	0.5	0.3	0.4	0.3	0.34
DMFS1 ²	1.6	1.8	3.1	4.4	4.6	5.9	<0.001
DMFS2 ³	0.6	0.5	1.4	2.6	2.6	3.9	<0.001
DMFT1 ²	1.3	1.5	2.2	2.9	2.9	3.9	<0.001
DMFT2 ³	0.5	0.4	1.0	1.6	1.6	2.4	<0.001

¹ Pits and fissures.

² Non-cavitated carious lesions were included.

³ Non-cavitated carious lesions were excluded.

than in the children from the other two areas. However, the Roddickton children had a higher mean number of sealed tooth surfaces (mean = 0.3) than the children from Flower's Cove (mean = 0.03) (Table IV).

The mean DMFS scores, including (DMFS1) and excluding (DMFS2) non-cavitated carious pits and fissures, are also presented in Table IV. Children in Forteau had the highest F/DMFS1 ratio (33.3 per cent), followed by children in Roddickton (14.9 per cent) and Flower's Cove (12.1 per cent). If non-cavitated carious pits and fissures are excluded from the DMFS scores, then the F/DMFS ratio increases to 57.1 per cent, 28.9 per cent, and 24.7 per cent, respectively.

Table V presents the means of the variables listed in Table IV by age. The mean dft score was significantly higher in younger children than older ones. On average, 3.5 decayed and/or filled primary teeth were found in seven-year-old children. A significant increase in the

mean number of non-cavitated pits and fissures, cavitated, filled and missing permanent tooth surfaces occurred between the ages of seven and 12 years ($P < 0.001$). The mean DMFS1 (including non-cavitated pits and fissures) was 5.9 at 12 years, and the mean DMFS2 (excluding non-cavitated pits and fissures) was 3.9. Similarly, the mean DMFT at 12 years was 3.9 (including non-cavitated pits and fissures) or 2.4 (excluding non-cavitated pits and fissures). By the age of 12 years, only 14.3 per cent of the children were free from dental caries (decayed, missing, and filled teeth) in the permanent dentition.

Table VI presents the findings from the regression analysis, which was performed using PC CARP. The risk factors significantly associated with a lower mean number of DMFS1 scores (square root of DMFS1 scores) were: the number of sealants present in the child's mouth; residence in Forteau; education status of the parents (high school versus elementary education); and the

child's grade level. Neither the sex of the child nor the early use of fluoridated toothpaste were significant risk factors. Because a relatively small number of children came from households with college- or university-educated parents, this factor was not statistically significant.

Fluorosis

The prevalence of fluorosis was less than 20 per cent in the children examined (Table III); very few teeth (an average of one tooth per student) showed signs of fluorosis; and the majority of the children with fluorosis (71 per cent) had a TSIF score of "1," indicating the presence of "very mild" fluorosis (Table III).

Discussion

The GRHS dental program is unique in the Atlantic region of Canada. It has successfully provided dental care to a population of more than 33,000 individuals, scattered over a large and relatively inaccessible region. Dunning,⁷ in his description of the GRHS

Table VI

Regression Analysis Of Square Root Of DMFS Scores

Variable	Coefficient	SE	P-value
Number of sealed tooth surfaces	-0.12	0.02	<0.001
Grade	0.24	0.03	<0.001
Sex	-0.08	0.08	N.S. ¹
Use of fluoridated toothpaste during year <1 and year 1 to 2	-0.05	0.03	N.S. ¹
Roddickton versus Forteau	0.03	0.01	<0.02
Flower's Cove versus Forteau	0.04	0.01	<0.02
Highest education in the household:			
High school versus elementary	-0.02	0.009	<0.02
College/university versus elementary	-0.02	0.01	N.S. ¹
Non-fluoridated versus other regions	0.03	0.02	N.S. ¹

¹ N.S. = not statistically significant

program, summarized the oral health gains that have occurred in this population since the 1930s, when he first visited the region as a volunteer. Patients now request high-quality dental care, including orthodontic treatment. This is a dramatic change from the 1930s, when Dunning regularly extracted four teeth for every one he filled.⁷

The findings of this survey provide a current examination of the dental caries prevalence in the region served by GRHS, and an up-to-date overview of dental health status of children in northern Newfoundland and Labrador.

Our data show that dental caries is endemic, and that the majority of the region's children (about four out of five) are affected. The mean DMFS scores of the children examined in this study are not different from those observed in similar children in Truro and Kentville, Nova Scotia,² who are also covered by a universal publicly financed dental insurance program. In Truro and Kentville, the mean DMFS1 was 4.3. It was 4.1 and 4.7 for the grades five and six children in this study, respectively. The major difference between the children in this study and those from Truro and Kentville is the higher mean num-

ber of filled tooth surfaces in the Nova Scotia children (two times higher), and the higher prevalence of non-cavitated carious tooth surfaces in children from northern Newfoundland and Forteau.

In Nova Scotia children, the mean number of non-cavitated carious pits and fissures was 1.4, compared to an overall mean of 1.9 in this study. The higher utilization of dental services and sealants in Nova Scotia may explain this difference.

Similarly, relative to children from Ontario, the children in this study had a higher prevalence of dental caries. The prevalence of caries-free status in five- to 13-year-old children in Ontario was 51.5 per cent,⁸ compared to a prevalence ranging between 11 per cent and 22 per cent in this study.

In 13-year-old Ontario children the mean DMFT was 1.46, and in five-year-olds the mean deft (decayed, indicated for extraction and filled) of primary teeth was 1.23. The mean DMFT score for children in northern Newfoundland and Forteau, Labrador, is almost two times higher, even when non-cavitated carious lesions are classified as "sound" in the analysis.

Another important finding was the sharp difference in mean DMFT scores between children aged seven to eight years and those aged nine to 12 years. In this population, the age of eight years represented a critical period for dental caries in the permanent dentition. Further research into the risk factors that may have contributed to this sharp increase should be carried out.

There is also a possibility that dental caries prevalence either has not changed since 1984, or may actually be increasing in the region.¹ Specifically, the mean DMFT scores (excluding non-cavitated carious pits and fissures) of seven-year-old children from Flower's Cove may have increased from 0.36 to 0.53 between 1984 and 1993, and there is no change in the mean DMFT scores of the children from Roddickton.

An increase of dental caries prevalence in the early school years may indicate an eventual further rise in caries prevalence as children grow older. A region-wide oral health survey is recommended to determine the current distribution of dental conditions in all of northern Newfoundland and Labrador.

In addition, while the average number of filled tooth surfaces was not statistically different among the children from the three regions, the mean number of decayed teeth was lower in Forteau compared to the other two regions. The dentist who provided many of the sealants identified in this study reported that he regularly placed sealants on the first permanent molars of children experiencing dental caries in the primary dentition (personal communication, January 25, 1995). Sealing the first permanent teeth in children with a past experience of dental caries may have significantly reduced the risk of caries development in the permanent dentition. Further research of this hypothesis is needed.

The ratio of non-cavitated to cavitated carious lesions observed in this study is similar to the ratio identified in previous studies using similar criteria.^{2,5} This finding re-

inforces the urgent need to change the restorative approach used to manage dental caries. Less traumatic and invasive approaches could reduce the time, cost, and discomfort associated with the conventional placement of restorations. For example, given the limited time and resources available to GRHS dentists working in the region, the use of sealants and the atraumatic restorative technique (ART)^{9,10} may be of value. ART, which was recently developed in Thailand, Africa and Europe, and adopted by WHO, could also be used by dental hygienists and dental therapists working under the direct supervision of a dentist, as required by Newfoundland's Dental Act.

This study showed that the prevalence of dental caries in the primary dentition of children in the three surveyed regions is about three times higher than in Ontario children.⁸ A public health program should be developed to reduce the prevalence and severity of dental caries in the primary dentition of young children in this region. The dental resources available in northern Newfoundland and Labrador are inadequate to meet the dental needs of children between birth and six years of life.

Finally, fluorosis prevalence is lower in northern Newfoundland and Labrador than in some parts of Nova Scotia² (40 to 70 per cent in Nova Scotia, versus 20 per cent in Newfoundland). The prevalence of TSIF scores of "2" or higher in this study was not different than the prevalence observed in Nova Scotia,² and ranged between 2.0 per cent and 8.0 per cent. We found that most children with fluorosis had previously lived in fluoridated regions in other parts of Canada. Water fluoridation and other cost-effective approaches to preventing dental caries should be promoted by public health officials in GRHS. ■

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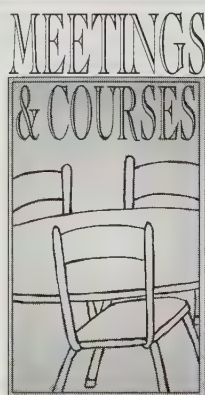
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and Seminar in Regina, Sask. Contact Dr. Dale Graham. Tel.: (306) 359-3945; fax: (306) 565-3260.

March 21

Advances In Preventive and Restorative Materials in Winnipeg, Man. Presenter: Dr. Kenneth J. Anusavice. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

March 27-28

Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632; fax: (519) 258-2637; e-mail: jberger@mnsi.net

April 18

Designing the Esthetic Occlusion and Cultivating Natural Esthetics in Winnipeg, Man. Presenter: Dr. Lloyd L. Miller. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

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American Academy of the History of Dentistry in conjunction with the **American Association of the History of Medicine** will meet prior to the ODA/CDA Convention in Toronto, Ont. Contact Dr. Audrey Davis, 1214 Bolton St., Baltimore, Md. 21217. Tel.: (410) 728-4810; e-mail: mabdavis@earthlink.net

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May 30

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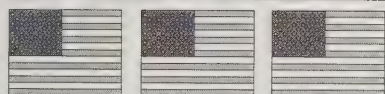
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October 2-3

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April 24-27

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April 30 - May 2

American Academy of Periodontology: Periodontal and Restorative Conference in Chicago, Ill. Contact Ms. Melodie Anderson. Tel.: (312) 573-3210; fax: (312) 573-3225; e-mail: melodie@perio.org

August 5-8

23rd American Academy of Esthetic Dentistry Annual Meeting: The Pursuit of Esthetic Excellence in Philadelphia, Pa. Contact AAED Headquarters, 1807 S. Washington St., Suite 106, Naperville, IL 60565. Tel.: (630) 355-0424; fax (630) 355-0474.

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27^e Congrès annuel de l'Ordre des dentistes du Québec in Montréal, Que. Contact Dr. Denis Forest. Tel.: (514) 875-8511; fax: (514) 875-1561.

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Prince Edward Island Dental Association Annual Meeting in Woodstock. Contact Ms. Nettie Likely. Tel.: (902) 566-5199; fax: (902) 892-4470.

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92nd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. Robert Mast. Tel.: (403) 346-7331; fax (403) 342-0133.

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ALBERTA - Edmonton: Looking for one - two dentists who now realize the limited potential of associateships. Our extremely affordable partnership units allow you to essentially operate your own clinic. There are senior dentists available to help with management as well as help enhance your clinical skills (including instruction for Steri-oss and Branemark implants). Our two-dentist facility is fully equipped, fully computerized, has an in-house lab and has had seven figure billings annually for the last 10 years. For more information reply in strict confidence to: tel. (403) 436-9055 or fax (403) 432-0517. D223

ALBERTA - Edmonton: Thriving, established (1989) practice for sale. Prime location in large enclosed mall in rapidly growing area. Averaging more than 70 new patients per month. Pan, 5 operatories (+1), computerized. Easily able to support two full-time dentists and has tremendous growth potential. Fax (403) 987-5221. D216

ALBERTA - Southwestern: Due to illness, must sell established rural general practice in the foothills of the Rocky Mountains. Beautiful new office built 5 years ago. Will stay on as associate to smooth transition. Excellent staff, hygienist, computer system, intraoral camera. Unbeatable lifestyle - skiing, watersports - yet 1 hour from the city. Phone (403) 627-4972, afternoons. D175

ALBERTA - Calgary Area: Located in vibrant town of 6,000 within 1 hour drive of Calgary, Alberta. High grossing individual practice. Four identical operatory rooms, plus two fully equipped for hygiene, all with X-ray and a separate panoramic X-ray room. Good opportunity for two dentists. Excellent prospects for growth. Phone (403) 435-1022. D140

ALBERTA - Edmonton: Endodontic opportunity for a practitioner who desires a short work week, low overhead and excellent financial reward. Please reply to CDA Classified Box #2730. D143

BRITISH COLUMBIA - Victoria Area: Practice opportunity wanted. Mature dentist desires purchase or partnership in Victoria, B.C., or surrounding communities. All offers will be given serious consideration. Please reply in confidence to CDA Classified Box # 2720. D045

BRITISH COLUMBIA - Lower Mainland: Dental practice for sale. Surrey/Newton business and shopping area, 72nd Avenue and King George Highway. Fast growing area. Easy access from all neighboring areas. Established practice of more than 25 years. Two-year-old office with four beautifully well-appointed operatories. Ground floor with good pedestrian visibility. Call (604) 261-2014 or (604) 594-0612. D195

MANITOBA - Central: Excellent opportunity, very busy, modern practice, ideal for two dentists. Computerized, Pan/Ceph, six-operator office with hygienist. Relaxed lifestyle, 4-day work week. Owner relocating, will stay on for transition. Dr. Robert Fraser, tel. (204) 623-3544, fax (204) 623-6162; PO Box 937, The Pas, MB R9A 1K9. D230

NOVA SCOTIA: Ten-year-old general practice, 3 - 4 days/week, 1 1/2 hours from Halifax or Moncton in Tatamagouche, Nova Scotia (home of the Carolinas). Only 20 minutes to downhill skiing. 1200 sq. ft. modern, spacious and comfortable office available for rent (two operatories, plumbed/wired for third, large lab, private office). Owner selling due to disability. Priced to sell. Tel. (902) 657-3223 (bus.), (902) 657-3704 (res.). D224

NOVA SCOTIA - Sydney: Well-established, 16-year-old general practice for sale in the heart of Sydney, Nova Scotia. Loyal clientele provide opportunity to practice all types of dentistry. No major equipment, but sundries and hand instruments included. Please reply in confidence to: CDA Classified Box #2734. D225

NOVA SCOTIA - Southwest: Step into a successful, modern dental practice in beautiful southwestern Nova Scotia. Three operatories, hygienist, pan. Owner leaving province. Reasonably priced. Serious enquiries only please. Reply to CDA Classified Box #2738. D219

NOVA SCOTIA - Dartmouth: Must see! Modern, high quality family dental practice. Located in very active business park. Efficient computerized recall system in place. Well established with good income potential. For more information contact Bill Tingley, (902) 835-1103 or 1-800-565-1525 within Nova Scotia. D052

ONTARIO: Exceptional opportunity 65 minutes from Toronto. Expanding community. Looking for conscientious dentist committed to excellence. Unique and charming office. Two full-time hygienists. Above-average gross and net. Owner wishes to sell practice on a succession basis over several years. Sale by owner. Enquiries: Mr. Ed Clair, Ash Temple Limited, 31 Scarsdale Rd., Don Mills, ON M3B 2R2. D206

ONTARIO - Ottawa Central: For sale, 5 operator solo general/restorative practice. 2,000 active patient files. Excellent recall system. Experienced staff know the patients well. Professional building on a main street, ample parking, near Queensway and bus routes. High gross and net. owner retiring to skate on the canal, ski, bike, enjoy the National Arts Centre and tulips in spring. Wonderful city to raise a family. Call Mrs. Business Manager, (613) 730-4251 mornings/evenings/weekends. D207

ONTARIO - North Toronto: Opportunity to relocate or "right-size" for an established dentist or certified specialist. New graduates are also welcome. Modern, established office. Centrally located in North Toronto. Flexible schedule. Reply to CDA Classified Box #2737. D217

QUEBEC - Montreal: Dental space available. Two completely equipped, modern operatories for rent. Situated in a downtown medical/dental building. Tel. (514) 842-1124. D205

Positions Available/Sought

ALBERTA - Grande Prairie: Excellent associate opportunity available immediately. A modern, expanding family clinic in a rapidly growing city. Averaging 100+ new patients per month. Please call (403) 539-1151 or fax (403) 532-5116. D203

ALBERTA - Edmonton: Full-time dentist required to associate in busy south-side practice. Position available after Dec. 31, 1997. Tel. (403) 450-1639 (bus.), (403) 436-7048 (res.). D212

ALBERTA - Edmonton: Experienced dentist required for busy emergency extended-hours clinic. All phases of dentistry are performed, but an emphasis on endodontics and extractions is predominate. Please fax resume to: (403) 489-2546. D181

BRITISH COLUMBIA - Victoria: Associate wanted, Victoria area, to start part time leading to full time, with a view in 2 years to purchase. Reply to: CDA Classified Box #2739. D228

BRITISH COLUMBIA - Sidney: Career opportunity in exceptional oceanside town. Non-assignment, growing practice committed to excellence. Win - win transition with advantageous tax structure. Personable dentist with "gold standard" philosophy and abilities will thrive in this superior west coast lifestyle. Dr. Harold Prussin, tel. (250) 655-4244. D208

BRITISH COLUMBIA - Vancouver/Lower Mainland Area: Dentist seeking partnership, associateship with intent to purchase. Will consider buyout. In Vancouver/lower mainland area. Tel. (604) 276-2048, (614) 221-1549, e-mail sverma@csi.compuserve.com D210

NORTHWEST TERRITORIES - Fort Smith: The garden capital of the north. Prettiest, best climate, lowest housing costs and cost of living in the N.W.T. Our busy, state-of-the-art family dental clinic has an immediate opening for a Canadian registered associate with high clinical standards. If that sounds like you and you love the outdoors, this could be just the place for you. Please phone (403) 872-2044, fax (403) 872-5813 or send resume to: Fort Smith Dental Clinic, PO Box 1047, Fort Smith, NT X0E 0P0. D215

NORTHWEST TERRITORIES: Canadian-licensed dentists - we have associate opportunities in our Inuvik Clinic and rotational opportunities with mobile dental teams serving remote aboriginal-based settlements. These are excellent opportunities for motivated, practical-minded dentists with a practical attitude and versatile level of skill. Please forward your resume and a covering letter to: Box 1360, Inuvik, NT X0E 0T0, or by fax to (867) 777-2774, attention Dr. Dean Gould. D178

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to CDA Classified Box # 2705. D012

NORTHWEST TERRITORIES: Excellent opportunity for associateship in clinics in Yellowknife, Iqaluit and Rankin Inlet, Northwest Territories. Modern state-of-the-art dental clinics with exceptional support staff. Some Arctic travel is involved. Emphasis is on good quality dentistry - we require dedicated, efficient dentists concerned with patient care and management. Please send resumes to: PO Box 1118, Yellowknife, NT X1A 2N8. D074

ONTARIO - Unionville: Wanted: pediatric dentist to associate in Unionville, Ontario, pediatric practice. Call (905) 513-7722 or fax (905) 513-7833. D227

ONTARIO: Pedodontist. Excellent opportunity 50 minutes north of Toronto in progressive four operator facility. Rapidly growing non-F1 area. Hospital privileges available. Established general dentist is in this excellent location. Turnkey position. Call Sharon at (705) 722-7600 or fax (705) 737-0858. D211

ONTARIO - London: Dental specialist wanted (preferably periodontist or endodontist) to work with other dental specialists in London, Ontario. Practice philosophy is high quality dentistry provided in a modern, upscale environment. Associateship or leasing arrangements available. Call Drs. Hebel and Gajjar at (519) 432-1153. D218

ONTARIO - Ottawa Area: Caring and efficient 1985 McGill graduate, recently moved to Gloucester, available for part-time associateship anywhere in Ottawa area. I have 8 years of private practice experience and 4 years of associateship. Would also consider vacation or maternity relief. Call Dr. Genevieve Leclercq, (613) 824-6155. D189

ONTARIO - North of Toronto: Locum dentist required for maternity leave in busy family practice just north of Toronto. Must have at least 1 year experience and be available 3, possibly 4 days a week. Please call Shelly at (905) 852-3131 or fax your resume to (905) 852-9558. D194

ONTARIO - Southwest: Family practice in Windsor is seeking a motivated and dedicated full-time associate. Reply to CDA Classified Box #2729. D145

YUKON - Whitehorse: Come and experience a pleasant Northern work environment. Whitehorse is a jewel of a community with a strong arts group, sports for the entire family, as well as the great outdoors within minutes of your home. We require an associate as soon as possible. Please reply to Dr. R. Pearson, 409 Cook St., Whitehorse, YK Y1A 2R2, tel. (403) 668-6077, fax (403) 667-6824. D016

CANADA: Estonian licensed general dentist, a member of American Dental Association (ADA) and member of Academy of General Dentistry (AGD) in Chicago, eligible for licence in Canada, interested in information about possible future work as an experienced general dentist in extended-hours clinic or established group practice. All phases of dentistry are performed. I am a caring,

conscientious, motivated individual, licensable in Canada. Please fax replies to 011-372-65-911-52 D229

NORTHERN VERMONT: Become an important part of a small town that has real Vermont charm. A wonderful opportunity for general dentist with clinical expertise and excellent interpersonal skills to join our fee-for-service practice. Associateship with future buy-in encouraged. Enjoy "hometown" community atmosphere as well as access to a local college and some of the best skiing and recreational activities in the east. If interested, please send resume to: CDA Classified Box #2738. D026

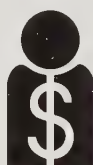
Vacation Rentals

MEXICAN RIVIERA - Ixtapa: For rent, 3 bedroom condo with pool and car. Overlooking the Pacific Ocean, excellent privacy in landscaped garden. Call (905) 765-0058 (res.). D067

Miscellaneous

PRESCRIPTION FOR WEALTH:

*Financial Planning for the
Health Care Professional*
Author: Dr. Terry Curran



"it's a winning prescription"
Author, Garth Turner

A great RRSP read.

To order: toll-free 800 567-7955

Price: \$23.95

(add \$1.96 for GST and \$4.00 for shipping)

D197

RESIDENCY IN ORAL PATHOLOGY AND ORAL MEDICINE Faculty of Dentistry University of Toronto

Resident position in Oral Pathology and Oral Medicine starting July 1, 1998.

This accredited program is conducted in the Faculty and in the laboratories and clinics of the University teaching hospitals. The residency is combined with graduate studies leading to the M. Sc. or PhD degrees. Salary for qualified appointee.

Application to:

Postgraduate Office
Faculty of Dentistry
University of Toronto
124 Edward St.
Toronto, Ontario M5G 1G6

D222

BULLETIN BOARD

BC PRACTICE OPPORTUNITIES...

EXCLUSIVE OPPORTUNITY RICHMOND, B.C.

Established general family practice offered for sale. Practitioner retiring from dentistry, available for flexible transition. 1,500 sq.ft., 4 ops fully equipped; Pelton chairs & lights, Adec carts, doctor & asst side cabinets, fibre optics, audio/video with intra-oral camera, lab, central sterilization, consult room, staff room, private office. Est. 1980, Expanded 1988, renovated 1991.

Excellent condition well maintained. Balance of lease plus 5-yr renewal. **LOW RENT** includes underground parking. Enhanced goodwill - **1300 active patients** on recall, 2800 + files on computer.

Comprehensive charting with future treatment planning & notes on patient interests. Skilled support staff available long term.

Annual gross \$450+ on 4 day week. 39% adjusted net. 30% hygiene component. Share transaction priced below \$275,000.

Please call John for particulars.

ASSOCIATE BUY-IN RICHMOND B.C.

High profile, well established dentist seeks associate who shares a commitment to excellence in dentistry and believes personal growth emanates from a caring attitude towards others. The requisite facility, staff, patients and financial performance must first be in place. It is! Longer term transition with mentor relationship available.

Interested? Contact John for interview with the owner.

GROUP PRACTICE - SOUTH VANCOUVER

Get involved in this well established, recently re-structured cost-share opportunity with 1,100 active px, hygienist, flexible hrs., **gross \$350k on 4 day week.** Facility Agreement to start with future group ownership potential. Ideal for dentist who seeks independence of a solo practice but financial benefits and min. administration of a cost-share. Asset priced

John Hallier - 604-517-1098
Don Halstrom - 604-576-9104

AMEX INTERNATIONAL REALTY

D231



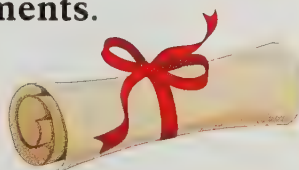
THE OPPORTUNITY OF THE YEAR!

We are inviting both general and specialized practitioners to attend the Convention, as the scientific program is composed from a wide range of lectures. The lectures examine the latest in scientific developments while maintaining a focus on the fundamentals of dentistry and the practical implications for your office. Hands-on Workshops and Courses encourage in-depth learning in small groups on specific areas of concentration. Our lecturers come from Canada, the United States and sometimes from international destinations. They are widely recognized in their field, chosen to bring a wealth of knowledge and expertise to convention participants.



The ODA-CDA 1998 Convention is designed to be a beneficial experience for all participants. For many, it is an opportunity to fulfill continuing education requirements.

The scientific program has been designed to include a wide variety of topics for each dental team member.



The Convention is also a time to meet new colleagues from across Canada, to reacquaint with classmates or renew



distant relationships. Participants interested in organizing Class Reunions, Study Club Reunions or any type of get-together should contact the CDA Convention department at

(613) 523-1770 ext. 246 or fax their request to (613) 523-3062.

General Lectures

The general scientific lectures of the Convention proper are open to all who are registered for the Convention. Lectures listed here are a preliminary listing and may be subject to change.

YOSEF NAHMIA, DDS, M.Sc.
Oakville, Ontario

Predictable Endodontics with the Use of New Technologies

WILLIAM DORFMAN, DDS
Los Angeles, CA

Building the Ultimate Esthetic Dental Practice

BRIAN COSTELLO
Toronto, Ontario

Taking Care of Your Money

HUGH DOHERTY, DDS, CFP
Use it or Lose It – Making the Most of Your Money

CAROL-LEE HEFFERNAN
President,

Potentia Plus Seminars
Vancouver Island, B.C.

Lighten Up ... It's Only Life

JOSEPH J. MASSAD
Tulsa, Oklahoma

Esthetics, Function & Phonetics is the Name of the Game

SHELLEY STUART
President,

Stuart Human Resources
Strathroy, Ontario

Defusing the Minefield of Employer/Employee Relations

HOW DO I REGISTER?

Registering for the ODA-CDA 1998 Joint Convention is as easy as 1-2-3.

There are 3 convenient ways to register:

1. By Mail

Send your completed registration and hotel reservation form to:



ODA-CDA
Joint Convention
1815 Alta Vista Drive
Ottawa, Ontario
K1G 3Y6

2. By Fax

Our fax line will receive registrations 24 hours a day. Simply choose the time that's most convenient for you and fax your enrolment form to (613) 523-3062.



3. By Phone

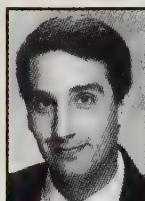


The Convention department will accept registrations by telephone at 1-800-267-6354 between 8:30 am and 4:30 pm EST. Registrations by phone will be available beginning **February 1, 1998**.

The Registration form is included in your *Preliminary Program* and will be published in the March 1998 issue of the *CDA Journal*.

It is important to fill out one form per person. Photocopy the forms if necessary or call our office to receive additional forms. Complete your registration form by choosing the courses and events you wish to attend. Fill out the hotel section to make a reservation.

General Lectures (continued)



MICHAEL SONICK

DMD

Clinical Instructor, Yale School of Medicine, Assistant Clinical Professor of Periodontics, University of Connecticut School of Dental Medicine, Fairfield, CT

Esthetic Management of the Maxillary Anterior Dentition

Simultaneous interpretation will be provided at this session for the benefit of all attendees.

This course will highlight the rationale and techniques for the implementation of periodontal surgery into practice. Great emphasis will be placed on comprehensive diagnosis, proper treatment planning and precise controlled surgical technique that leads to predictable results.

A variety of surgical techniques and their rationale will be demonstrated for pocket elimination as well as regenerative procedures including bone grafting and guided tissue regeneration. An attempt will be made to make sense out of the multiplicity of flap procedures and designs, including indications for sulcular vs inverse bevel incisions, full thickness flaps, and apically positioned vs repositioned flaps.

Suturing styles, techniques and indications will be discussed in detail including simple interrupted, continuous sling, horizontal mattress, internal vertical mattress and external vertical mattress.

A papilla retention anterior maxillary flap will also be shown. This flap enables one to provide anterior pocket elimination without disfiguration. Participants will have the opportunity to clinically apply the material.

MICHAEL WISEMAN,
DDS, SASGD,
Private and

Hospital-based Practices
Mount Sinai Hospital
Maimonides Hospital,
St-Mary's Hospital
Montréal, Québec

*Geriodontics: You've Come
a Long Way Baby!*

GLENN WOLFINGER, DDS
STEVEN P. QUINN, DDS

Co-Director, Mid America
Center for Dental Implants
Springfield, Missouri
*Dental Implant Surgery:
What a Surgeon Can
and Should Do for his
Restorative Colleagues*

RICHARD SIMONSEN, DDS
St. Paul, Minnesota

Head, Professional Services
3M Dental Products Laboratory
*The Changing World of
Preventive, Restorative
and Esthetic Dentistry*

BARBARA COLOROSO

Littleton, Colorado
*Kids are Worth It!
Parenting with Wit and
Wisdom – Raising
responsible, resourceful,
resilient and caring children*

FRAN BERKHOF, RD

Toronto, Ontario
*Nutritious Bites :
A New Look at
Diet and Dental Health*

MARGARET BECK,

M. Div., M.S.W.
Acting Director,
National Eating Disorder
Information Centre,
Toronto, Ontario
*Approaches to Eating
Disorders for the
Dental Health Professional*

JOHN SVIRSKY, DDS, M.Ed.

Professor of Oral Pathology,
Virginia Commonwealth
University School of Dentistry,
Richmond, Virginia
*Sex and the Single Nevus:
Everything you wanted to
know about Oral Pathology
and Oral Medicine*

HOWARD FARRAN, DDS, FAGD

Private Practice
Phoenix, AZ
Painless Success

JEFFREY CAMM, DMD

Pediatric Dentist,
Colonel, US Air Force
Dental Corps
Mc Chord, AFB, Washington
*Behaviour Management
Techniques for Pediatric
Dental Patients*
*Anomalies of the Pediatric
Oral Cavity*

GARY REISER, DDS

Swampscott, Massachusetts
*Periodontics and Implants
for Hygienists*

DAVID KENNY,

B.Sc, DDS, Ph.D.

EDWARD BARRETT

B.Sc, DDS, M.Sc
Hospital for Sick Children
and Faculty of Dentistry
University of Toronto
Toronto, Ontario
*Dental Trauma: Diagnosis
and Management*

CATHY JAMESON

BS Ed., M Psych.
Founder and President
Jameson Management Group
Davis, Oklahoma
*Great Communication =
Great Production*

SALAM SAKKAL, DMD, MS

Associate Professor,
Department of
Restorative Dentistry,
Université de Montréal
Assistant Dean for
Continuing Education
*Current Solutions
for Post & Core:
From an Endodontic and
Prosthodontic Point of View*

ASHLEY GOODMAN

San Diego, CA
Hypnosis

WILLIAM ARNETT, DDS, FACD

Lecturer, Clinical Instructor,
UCLA, University of
Southern California,
Loma Linda University
and Valley Medical Center
at Fresno.
Santa Barbara, CA
*Facial Esthetics, Orthodontics
and Orthognathic Surgery*

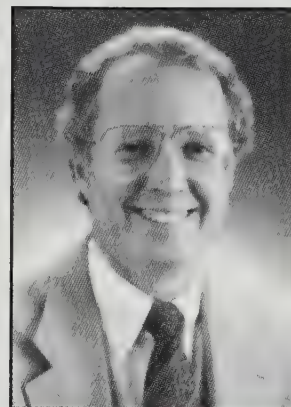
DALE MILES, BA, DDS, MS

Director of Graduate Program,
Oral and Maxillofacial
Radiology
Indiana University
School of Dentistry,
Carmel, Indiana
*Intraoral Digital Imaging
Systems: Are you ready
to go electronic?*

*New Trends in Panoramic
Imaging*

*CT and MRI for
Dental Problems:
What do I really want?*

*A program especially designed for those who
graduated between 1988 and 1998*

**NEW DENTISTS
PROGRAM**

*Breaking Through the Breakthrough
Performance — The Why's and How's
of Successful Practice Development*

This year's half-day program will feature,
Mr. Doug Young, a prominent speaker in
the area of practice management, including
financial planning, human resources man-
agement and the legal issues surrounding
the set-up of a new practice.

Co-sponsored by CDA & CDSPI

Pharmacology and the Dentist

NEIL SHEAR – *How to Manage a Patient
With Allergy to Local Anesthetics*

LORI SHAPIRO – *How to Manage a Patient
With an Allergy to LATEX*

SANDRA TAYLOR – *How to Manage a
Patient with Valvular Heart Disease
or Prosthetic Devices*

ELIZABETH PHILLIPS – *How to Manage
a Patient with a Blood Borne Infection*

SANDRA KNOWLES – *How to Manage a
Patient with Multiple Antibiotic Allergies*

SANDRA KNOWLES – *How to
Treat the Pain in the Allergic Patient
(Discussing ASA and Codeine Allergies)*

HANDS-ON COURSES

■ ESTHETICS



Paul Belvedere

DDS, FASDA, FACD
Professor, Post-Graduate
Program, Esthetic Dentistry,
Baylor College and State University
at Buffalo, New York
Edina, Minnesota

*Simultaneous interpretation
will be provided at this session
for the benefit of all attendees.*

Expanding the General Dental Practice with Non-Metallic Techniques Through Progressive Composite Dentistry

A multimedia presentation, slides and closed circuit TV demonstration, teaching practical, time-saving, techniques which will be used the next working day for every participant. You will leave with a higher degree of confidence in their use of composite resins, reduced chair-time techniques, and with expanded treatment modalities which will increase their practices.

Participants must have completed this course to attend the following session.

High Quality, Composite Dentistry for the Practical Dentist

The goal of the hands-on course is to give the doctors a first-hand tactile experience in placing matrices in different restorative situations, and restoring the prepared teeth with the advanced techniques that have proved successful in Dr. Belvedere's practice.

Dr. Belvedere has been demonstrating and teaching the control of polymerization shrinkage by bulk placement of the composite in all direct composite techniques since 1985. The clinical success of his methods is now being recognized by leading researchers in dental materials.

Dr. Belvedere encourages doctors to bring their staff members and to ask questions during the day as efficiency increases with team effort. This seminar will give the participants practical information that they will make use of the very next practicing day. His techniques are being used and praised here and abroad.

*An integral part of
the Continuing Education
portion of the Convention
are the Hands-on courses.*

*Participants wishing
to attend a hands-on
workshop must pre-
register for these courses
clearly indicating
their selection(s) on the
registration form.*

*Registration in these
courses is on a first-come,
first-served basis.*

*The following sessions
will be offered throughout
the Convention.*

■ ENDODONTICS



Salam Sakkal

DMD, MS
Associate Professor, Department
of Restorative Dentistry
Université de Montréal
Assistant Dean for
Continuing Education

Advanced Concepts in Endodontics

This hands-on workshop will review many new and advanced techniques in endodontics in order to improve your skills and allow you to implement these most recent concepts within your practice immediately and perform endodontics with better control, ease and satisfaction.

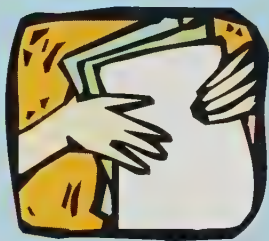


Table Clinic Presentations

The selection of **Table Clinic speakers** is presently under way. Details will be published in the *CDA Journal* and the *Ontario Dentist* as they become available. Full information will

appear in the *Final Program* which will be distributed to all delegates at the Convention.

The CDA/Dentsply Student Table Clinic program is scheduled for Thursday, May 7. The judged table clinic competition will take place in the morning and an open session for students to display their clinics to convention attendees will be held in the afternoon in the exhibit hall.

Continuing Education

*The 1998 ODA - CDA Joint Convention is a great place
to acquire valuable continuing education credits.*

Each hour spent in a clinical course or lecture will earn you credits. Proof of attendance will be provided at the Convention which you can then submit to your licensing body to count towards fulfilling your continuing education requirements.



HANDS-ON COURSES

■ HIGH TECHNOLOGY PRACTICE



John H. Jameson

DDS
Jameson Management
Group
Davis, Oklahoma

High-Tech Dentistry: Its Integration into the 21st Century Practice Today (Part I)

The rapidly expanding field of diagnostic and patient education technology is an area of dentistry that is most on the minds of clinicians internationally. The questions from practitioners not only are concerning the equipment available but its incorporation into the practice. This incorporating is the area least understood by practices that are attempting to increase clinical efficiency and generate a profit. Dr. Jameson will help lead the dentist and the entire team to a new level of understanding previously not accomplished by many practices.

This seminar is a must for dental practices trying to stay on the "cutting edge".

High-Tech Dentistry: Its Integration into the 21st Century Practice Today (Part II)

This half day "hands-on" demonstration session offers the attendees an opportunity to work with a variety of high-tech diagnostic and educational equipment available on the market today. Trained technicians will be available from the various companies to provide assistance for the attendees with their exposure to the technology.

Each participant will be provided opportunity to work on a variety of equipment, to capture images and save them digitally for future use. Manipulation of images will be demonstrated and practiced so that the participant will understand how to manage these images in the new patient and consultation experience.

■ PERIODONTICS



James Grisdale

BA, DDS, Dip.Prosth.,
Dip.Perio, MRCD (C)
Lecturer and clinical researcher in
Continuing Dental Education
University of British Columbia,
Vancouver, B.C.

Hand and Powered Periodontal Instrumentation

Successful management of the periodontal patient begins and ends with control of the root surface environment. The most difficult and critical modality or therapy in dentistry is scaling and root planing. This program addresses that issue with the most current techniques and instruments to achieve a root surface compatible with biologic health. The participant will become familiar with the new generation of hand instruments and ultrasonic systems. The hands-on portion of the program covers the in-depth use of ultrasonic instrumentation and an opportunity to utilize the latest in piezoelectric instrumentation on a typodont.



Harinder S. Sandhu

BDS, PhD, Dip in Perio
Associate Professor
and Chairman
Division of Periodontics
University of Western Ontario
London, Ontario

Clinical Periodontal Surgery

Surgical Therapy is an integral part of comprehensive periodontal treatment. Pocket reduction remains the ultimate goal of non-surgical treatment modalities. The development of newer plastic surgical procedures have taken the field of periodontal surgery to new horizons. This course will discuss the rationale behind the various treatment modalities and the participants will perform some surgical procedures on pig jaws during this hands-on course.



**REGISTER BEFORE
APRIL 3, 1998**

**and become eligible
for great cash prizes
and draws!**

All practising Canadian dentists registered before April 3rd, 1998 for the ODA-CDA 1998 Convention are eligible to win the car, or a three-year lease. Simply visit the Ash Temple booth at the Exhibit Hall and drop off your ballot in the designated box. You could end up driving away in a new Mercedes.

**Register before April 3, 1998
and you could win a trip for
two to an exotic location
compliments of Aurum Ce-
ramic/Classic Laboratories.**

Keep reading the Convention pages of the *CDA Journal* for more details.

**CONSULT YOUR PRELIMINARY PROGRAM
FOR THE DATES AND TIMES OF THESE LECTURES.**

HANDS-ON COURSES

■ RESTORATIVE



George Freedman

DDS, FAACD

Director of Post-graduate Programs in Esthetic Dentistry at State University of New York at Buffalo, the University of Minnesota (Minneapolis), the University of Missouri (Kansas City) and at the Eastman Dental Center, University of Rochester, New York.

Tooth Whitening: Hands-on the Future

The whitening of teeth is the most popular treatment in dentistry today. Numerous techniques and materials are available to the practitioner. This hands-on program is designed to familiarize the dentist with the latest in treatment modalities and the most effective de-staining materials.

Both in-office and at-home techniques are demonstrated. Each participant fabricates a whitening stent and has an opportunity to assess an array of whitening products.

The topics covered include: Safety of tooth whitening, marketing this procedure in everyday practice, treatment documentation, and tooth whitening prior to veneer treatment.

The workshop provides information which can be put to use immediately by dentists and their staffs.

Impressions to Provisionals

New materials and techniques in impression materials (such as automixing syringes) have simplified the process of replicating the prepared tooth. The improved chemistries of the impression material allow for more accurate, faster impressions in a moist environment.

In this hands-on course, the following techniques demonstrated are: automixing impression, (wash and tray) materials, fast-set impression materials, and a simplified triple-tray technique.

Provisional restorations have long been necessary nuisances to the dental profession. Even the name "temporaries" denoted the transient and unimportant nature of these procedures. Recent advances in clinical provisionals, however, include better chemistries, easier manipulation and the ability to correct and repair the provisional. The following techniques are demonstrated: single crown provisionals, bridge provisionals, inlay-onlay provisionals, and provisional characterization.

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This year, Convention participants who fly **CANADIAN AIRLINES** will be eligible for a draw! This draw is for two economy class return tickets good for travel on any **CANADIAN AIRLINES** serviced destination in North America (some restrictions apply).

To enter, you will be required to drop your **CANADIAN AIRLINES** boarding pass with your name on it in the ballot box — so don't discard your boarding pass! (Acceptable boarding passes will be only from Convention participants who flew **CANADIAN AIRLINES** to attend the ODA - CDA 1998 Convention.)

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While entry to this event is free — please make sure that you request the ticket in the appropriate box on the registration form.

The show's feature performer, Canada's top Tom Jones impersonator, Lou Nelson, from "Legends in Concert", tops off an incredible evening of entertainment, with the Reno Show Band and their hit parade from the 60's to the 90's.

VIVA LAS VEGAS!

COME AND LIVE THE EXPERIENCE ON THURSDAY, MAY 7TH!

KEYNOTE SESSION

A Keynote Session will launch the Convention proper at the Opening Breakfast on Thursday, May 7 at 7:30 a.m. This event will be held at Planet Hollywood, adjacent to the Convention Centre. The cost is \$15.00 per person.



Shirley Roberts is an experienced marketer and a published author. She has an Honours B.A. in Business Administration and was on the management committee of a large multi-national corporation prior to starting her firm. Shirley is an accomplished speaker who is passionate about the need to adopt new marketing strategies because of emerging trends. In order to help her clients capitalize on these trends, extensive, ongoing trend-tracking research is conducted on the eight key drivers of consumer spending and industry specific trends. Shirley's audiences get first hand information on new approaches which are critical to deal with very different consumers in the next millennium.

Power Shift to Patients

Our world is being transformed at a gale-force pace. Futurists tell us of even greater changes to come. These changes have had, and will continue to have a dramatic impact on consumers and on their spending habits.

Find out what the leading and responsive drivers of consumer spending are. Learn how changes in these drivers will impact consumers in the new millennium. They will be challenged to think differently about their business. Capitalize on emerging trends by using the marketing strategies Shirley proposes.

DENTAL TRADE EXHIBITION

The Dental Trade Exhibition at the ODA - CDA 1998 Joint Convention will take place at the Metro Toronto Convention Centre on Thursday, May 7 and Friday, May 8. Exhibit hall hours are 10:00 a.m. to 6:00 p.m. on Thursday and 9:00 a.m. to 6:00 p.m. on Friday.

Take stock of your office inventory and equipment needs prior to the Convention then plan to visit your suppliers and do some comparison shopping on the exhibit floor. Many exhibitors offer special discounts during the Convention.

Educate yourself and your dental team on the latest in dental technology, equipment and supplies at the 1998 Convention.

In addition to visiting the trade booths, the exhibit hall will be a great meeting place for you and your colleagues.

MARKETPLACE PROGRAM

Join Arthur Andersen and the ODA's Economics of Practice Committee as they unveil the results of their new Activity-Based Management initiatives.

This workshop will use an actual dental practice to show participants the practical aspects of this program in order to enhance the financial performance of your practice. Improve your gross revenues, recognize and better utilize your administration resources and control the costs involved in all areas of your practice with these highly successful and proven management concepts. The time has come for a meeting of the minds in dentistry and Activity Based Management.

EXHIBIT HALL DEMONSTRATION

Thursday, May 7, 2 p.m. & Friday, May 8, 10 a.m.

Food as Medicine: Bridging the Gap between Health and Flavor

We used to eat foods because they were delicious. Now we eat foods also for their medicinal qualities. Join Fran Berkhof and Bonnie Stern as they show you how delicious nutritious food can be. Bonnie cooks while Fran tells you all about the health benefits of the ingredients.

BONNIE STERN

The Bonnie Stern
Cooking School



FRAN BERKHOF

RD
Dietitian-Nutritionist
Toronto, Ontario



The focus will be on the newest research regarding the "medicinal qualities" of popular foods like fruits and vegetables, fish and tofu. Through the recipes you'll learn how to incorporate these foods in your diet in many delicious ways, you'll receive lots of cooking and nutritional tips and you'll have the opportunity to ask questions. Be sure to attend the marriage between health and flavor.



GOLF TOURNAMENT

Million Dollar Challenge IV

The Aurum Ceramic/Classic — Dentistry Canada Fund "Million Dollar Challenge IV" will take place at the CDA Golf Tournament on Wednesday, May 6, 1998 at the Lionhead Golf & Country Club, 8825 Mississauga Road, Brampton, Ontario, with a shotgun start at 8:00 a.m. The price is \$169.00 plus tax.



There will be a qualifying hole which will designate one golfer to shoot for a million dollars at one of the shoot-out locations.

CDA will donate \$20.00 of each entry fee to the *Dentistry Canada Fund*. Golf carts and barbecue lunch are included in the registration fee.

To register, simply check the "Golf" section of the enrolment form and send the required fee. If you have a foursome, send in the four names with your enrolment. All four players need to be pre-registered for the golf tournament in order to make a four-some.

Space is limited.

Registrations will be processed on a first-come, first served basis.

Hotel Accommodations

The rates stated for each of the hotels are based on the European plan (accommodation only). There are additional fees for a third person over 18 years of age, staying in the guestroom.

Crowne Plaza Toronto Centre

225 Front St. W.,
Toronto M5V 2X3
\$149.00 single / \$159.00 double

Located in the heart of the entertainment district, the Crowne Plaza Toronto Centre is connected to the Convention Centre, Skydome, CN Tower, and the CBC Broadcast Centre. Steps from the Harbourfront, fashion district, all major theatres and over 200 restaurants. Deluxe rooms offer two telephones with voice messaging and teleconferencing, mini-bar, coffeemaker, TV and in-room movies. Indoor pool, Spa/Fitness centre, Non-smoking rooms, Restaurants, and Lounge on site.

The Royal York Hotel

100 Front St. W.,
Toronto M5J 1E3
\$159.00 single/double

Known for decades as the pride of Toronto, the elegant Royal York lets you experience this city like no other hotel can. First opened in 1929, this grand hotel has 1,365 fully renovated rooms, 10 restaurants and lounges. This Toronto landmark is located in the heart of downtown shopping, business, entertainment and sightseeing district. Across from Union Station, connected to underground shops and subway. Swimming pool, Spa/Fitness Centre, non-smoking rooms.

SkyDome Hotel

1 Blue Jays Way,
Toronto M5V 1J4
\$129.00 single / \$139.00 double

The world's only sports and entertainment hotel, it is part of Toronto's SkyDome. Floor to ceiling windows offer an excellent view of the stadium, famous for its retractable roof. Futuristic design throughout the hotel accompanies sports-oriented theme, from artwork to memorabilia. Business Centre, swimming pool, spa/fitness centre, non-smoking rooms, restaurant and lounge on site.

Holiday Inn on King

370 King St. W.,
Toronto M5V 1J9
\$139.00 single/double

Full service hotel ideally located in the heart of the theatre and entertainment district of downtown Toronto. Steps away from the CN Tower, the SkyDome, Metro Toronto Convention Centre, Royal Alexandra, and Princess of Wales Theatres, Roy Thomson Hall and only minutes away to the Eaton Centre, Harbourfront, Ontario Place, and Toronto Island. Featuring 425 distinctive guestrooms and suites, two restaurants and lounge facilities; meeting and banquet space to 1000; seasonal outdoor heated swimming pool, spa/fitness centre, tanning salon, massage therapist and heated underground parking.

For reservations, see the Hotel Reservation Form on the second page of the 1998 Convention registration form

Plan a long weekend around your professional development activities and take advantage of all Toronto has to offer.



Toronto Tours Ltd. has designed a tour program for the delegates of the ODA/CDA 1998 Joint Convention, in which participants register for tours directly with Toronto Tours Ltd.

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THEATRE

Toronto is the third largest theatre centre (after London and New York) in the English speaking world. Enjoy world-class musicals on Ed Mirvish's "Theatre Row", just blocks from the conference centre, or meander uptown to the beauty of the Pantages theatre, home of the Canadian company of *Phantom of the Opera*.



DINING

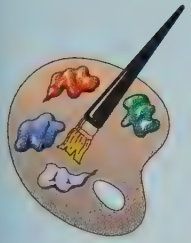
Toronto is a multicultural mecca with more than 80 ethnic groups speaking 100 languages, and offering diners a taste of the world at more than 5,000 restaurants.

SHOPPING

Take in international-class shopping at the glittering Eaton Centre, browse the quieter galleries and boutiques of Yorkville village or check out the trendy fashion shops along the Queen Street strip.

The Harbourfront Antique Market is Canada's largest permanent antique show, open year round, and the Sunday Market is an exciting antique and collectibles marketplace.





MUSEUMS & GALLERIES

Toronto is home to several world-class museums including the Royal Ontario Museum, the Art Gallery of Ontario, the Gardiner Museum of Ceramic Art and the Inuit Art Gallery. Or visit the famous Canadian "Group of Seven" collection in Kleinburg, an hour north of the city.

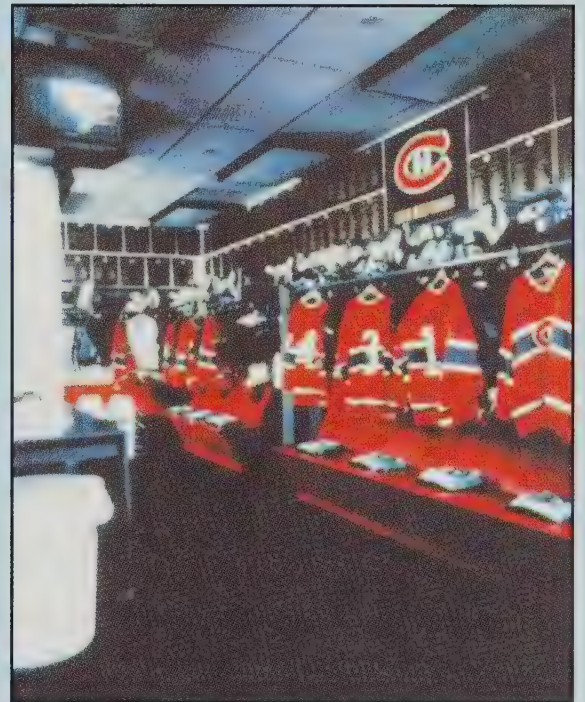


ATTRACTIONS



The CN Tower is one of Toronto's most popular attractions. The world's tallest free standing structure, at 1,815 feet, hosts visitors in a breathtaking glass-floored observation gallery 1,122 feet above the ground!

Nearby waterfront activities include Queen's Quay shopping and restaurants, and the new 'Docks' entertainment complex.



Regional attractions:

Visit the casino and ride the Maid of the Mist steamboat in Niagara Falls. African Lion Safari, in Cambridge, features more than 1,000 exotic animals and birds and the 710-acre Metro Toronto Zoo (northeast of the city) is home to more than 4,000 animals.



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Cool Mint Listerine Antiseptic
Freshburst Listerine Antiseptic
Cool Mint Listerine Toothpaste and Gel

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Arm & Hammer Dental Care Gel

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REACH Dental Yarn Gentle Gum Care
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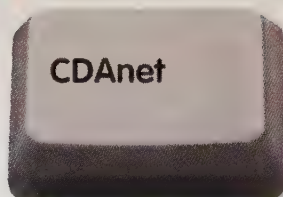
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IT'S MY OPINION



Surprise, The Emperor Has No Clothes

Garry O. Robertson, DMD, M.S.

In the March/April 1997 edition of *Communiqué*, we were advised that CDA has approved new Guidelines on HIV Blood Testing.¹ The guidelines state, in part, that a dentist has the right to order HIV blood testing, but only if four criteria are met. One of these criteria is that "The test is required for the diagnosis or treatment planning of the patient."

The criteria are followed by the usual admonition: "Since universal precautions should always be followed, infectious agent testing should not be required to ascertain the degree of infectious risk a patient may present to a practitioner."

A quote attributed to Dr. Trey Petty, the former chairman of CDA's committee on community and institutional dentistry, states "The intent of the guidelines is to make dentists aware of where we think this testing is appropriate, and to help dentists order and handle these tests properly."

Interestingly, in his submission to the July/August issue of the Alberta Dental Association's *Updater*, Dr. Petty recommends a special standard of care in clinics treating known HIV patients: "Dental offices that treat several known patients living with HIV may wish to consider having at least one or two doses ..." of anti-retroviral protease inhibitors, which "...reduce the risk ... of

acquiring an HIV infection after percutaneous exposure."

By suggesting that "Dental offices that treat known patients living with HIV should be aware of these new recommendations ...," Dr. Petty is in effect stating the obvious: the identification of a known vector is the most important aspect in containing a disease and protecting the public at large.

In his *Updater* article, Dr. Petty states: "Expediency in administering the anti-retroviral medications is crucial to the success in preventing seroconversion to HIV." He also notes the potential toxicity of these drugs, and points out that they may cause a number of significant side effects which "... may become debilitating while the drugs are being taken," and that "the safety of 3TC during pregnancy has not been established."

So the emperor has been defrocked! If universal precautions are to be followed to the letter, shouldn't all health care personnel "universally" receive anti-retroviral protease inhibitors following each and every needle stick — including pregnant staff members (whose fetus might subsequently abort or be born with a birth defect)?

Out of a desire to be politically correct, government has advised the health-care professions that patients may refuse to divulge their HIV status, even to a health-care worker who has received a

needle stick injury. To guard the civil liberties of patients with HIV, our politicians, aided by the legal profession, seem quite content to let the AIDS epidemic rage at will.

Essentially, government is ignoring the potentially devastating effects of HIV transmission to health care workers, and their unborn children, to protect the identity of the carriers. In some instances, health authorities are legally prevented from notifying spouses whose partners have tested positive for HIV. Has the world gone mad?

We are saddled with an HIV epidemic because we have not been allowed to follow the standard public health measures that have enabled us to control tuberculosis and other diseases — including sexually transmitted diseases. Attempting to control a disease without making an effort to identify the carriers is not biologically credible.

How has this come about? Our policy has been hijacked by representatives of the well-organized homosexual community and their allies in the legal, political, and medical establishments. If anyone stands up and objects to this outrage, they are immediately ostracized, called "homophobic," and attacked in other ways that threaten their livelihood, in an attempt to silence them.

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A recent example was the case of MP Dr. Grant Hill, who argued in the House of Commons that human rights protection for homosexuals would promote an unhealthy lifestyle. In response, three physicians who treat HIV patients in the Wellesley Health Centre in Toronto held a public news conference condemning Dr. Hill. One of these physicians also filed a formal complaint against Dr. Hill with the College of Physicians and Surgeons of Alberta, which, in essence, was an attack on his professional license in medicine.

Whatever happened to "free speech"? We are at a sad juncture in our history when a physician cannot make a statement of fact in the House of Commons without a hateful, vengeful attack being made on his character and career.

AIDS is a terrible disease that must be conquered by mankind. To do this, we must follow historically proven public health measures to identify the vectors of the disease. The homosexual activist agenda would have us believe that

if enough money is spent on research, a cure can be found without us needing to know who is infected. This line of pseudo-reasoning ignores the terrible suffering and enormous costs that will be incurred before the "silver bullet" is found. For what? So someone with AIDS won't be made to feel personally "uncomfortable" with special precautions being taken when a health care worker attempts to treat them?

Ladies and gentlemen of the dental profession, it is now time to stand up and be counted. We must support proper, biologically sound, public health measures. To do anything less decreases our credibility as a profession. "Universal precautions" are good guidelines, but we should not be co-opted to support the corrupt agenda of political activists.

The other — and more important — side of the equation is the responsibility of the people afflicted with AIDS/HIV. They must be legally required to inform all of their health-care providers and

sexual partners of their disease status to prevent the continuation and spread of this terrible disease.

We must also demand the right to routinely test patients for HIV/AIDS — as is already being done for hepatitis, etc. — before providing risky medical procedures. Testing does not change our medico-legal responsibility to keep the patient's disease status confidential, but it is a rational approach to halting this epidemic. Let us all give "universal precautions" the proper place in good medical-dental practice, but avoid using them as a smoke screen for proper public health measures. ■

Dr. Garry O. Robertson is a certified specialist in orthodontics, and practises in Calgary, Alberta.

Reprint requests to: Dr. Garry Robertson, 1100-10655 Southport Rd. S.W., Calgary, AB T2W 4Y1.

Reference

1. CDA Approves Guidelines On HIV Blood Testing. *CDA Communiqué* March/April, 1997, p. 4.

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ARE YOU A NEW DENTIST?

INTERESTED IN BECOMING A COMMITTEE MEMBER?

The Canadian Dental Association is establishing a data bank of new dentist members who are interested in becoming involved in the activities of their national organization. New dentists are defined as members who have graduated within the last 10 years.

Currently, only four per cent of CDA's committee, council and board members are new dentists, even though new dentists account for 28 per cent of the association's membership. CDA is attempting to increase the proportion of new dentists serving in CDA's political structure to correspond with the proportion of new dentists in CDA's total membership.

If you are interested in serving as a member of one of CDA's committees, please write to CDA, attention Ruth Beaulieu, Coordinator, Corporate Affairs, enclosing a current curriculum vitae, indicating areas of interest to you and, where appropriate, how your background and expertise relate. Your name will then be added to the data bank for consideration when vacancies arise. Should your name be chosen, you will be contacted for further confirmation of your interest in serving.

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It's a great investment opportunity. So contact CDSPI to find out more. And get your investment planning together.

* Offered through Sun Life Securities Inc.

The Canadian Dentists' Investment Program is administered by CDSPI for eligible members of the Canadian dental profession. The CDA Self-Directed RSP, CDA Self-Directed RIF and CDA Investment Account will be available as of January, 1998 in British Columbia, Alberta, Saskatchewan, Ontario, Nova Scotia, Newfoundland and Prince Edward Island, and at a later date in other provinces and territories.



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Journal

Vol. 64, No. 3 • March • 1998



Patient Attitudes Toward Dentistry

Patient Satisfaction With Dentures
Made By Dentists and Denturologists

Pain Sensation and Dementia

Ontario Initiates Dental Practice
Review Program

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Microbex has a whole range of microbial control products and services to cover your every need.

Our full-spectrum Ethanol solution disinfects instruments or surfaces in one minute – our tests prove it! This increases productivity while accelerating patient turn-around.

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These and many other reasons make Microbex the Canadian leader in asepsis products today.

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Microzyme

Dual Purpose Enzymatic Instrument Pre-Soak and Ultrasonic Cleaner
Solution enzymatique de pré-traitage. Instruments et nettoyage ultrasonique

1.5 L (40 fl. oz.)
4. Phosphate buffers
5. Enzymes (2.5 L)
6. Surfactant
Dilution: 1:10
Ratio: 100 ml
10 pumps to 1000 ml
water
Content: Enzyme 4%,
Surfactant 22%
MICROBEX 2 L
1.5 L (40 fl. oz.)
4. Phosphate buffers
5. Enzymes (2.5 L)
6. Surfactant
Dilution: 1:10
Ratio: 100 ml
10 pumps to 1000 ml
water
Content: Enzyme 4%,
Surfactant 22%

Sonibex

Ultrasonic Disinfecting Detergent Concentrate
Détérgent ultrasonique désinfectant concentré

This is a highly concentrated
detergent, designed for
ultrasonic cleaning of
instruments.
Dilution: 1:10
Ratio: 100 ml (3 pumps)
to 1000 ml water
Content:
1.5 L (40 fl. oz.)
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Ratio: 100 ml
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Surfactant 22%

On peut utiliser
ce détérgent
concentré pour
le nettoyage
ultrasonique.

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Virobex-P

Antimicrobial Liquid Handwash
Solution antimicrobienne pour les mains

Ready to use. No rinsing
needed. Kills 99.9% of
all microorganisms
including bacteria, viruses,
fungi and protozoa.
Directions: Use
Saturate hands for 15
seconds. Rinse
thoroughly with dry
towels.
Active ingredients:
2.5% alcohol
2.5% chlorhexidine
2.5% benzalkonium
chloride

1.5 L (40 fl. oz.)
4. Phosphate buffers
5. Enzymes (2.5 L)
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Dilution: 1:10
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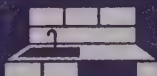
Virobex-P

Antimicrobial Liquid Handwash
Solution antimicrobienne pour les mains

Surfex-E

Ethanol Disinfectant for Hard Surfaces
Désinfectant à l'éthanol pour surfaces rigides

Ready to use. Do not
dilute.
Active ingredients:
70% Ethyl Alcohol,
0.14% Chlorhexidine
Dilution: 1:10



Prêt à utiliser. Ne pas
diluer.
Ingrédients actifs:
Alcool éthylique à
70%, Chlorhexidine
de chlorhexidine à
0.14%

Instrubex-E

Ethanol Disinfectant for Instruments
éthanol pour instruments

Noter:
1. Dilution: 1:10
2. Active ingredients:
70% Ethyl Alcohol,
0.14% Chlorhexidine
Dilution: 1:10

1.5 L (40 fl. oz.)
4. Phosphate buffers
5. Enzymes (2.5 L)
6. Surfactant
Dilution: 1:10
Ratio: 100 ml
10 pumps to 1000 ml
water
Content: Enzyme 4%,
Surfactant 22%

Instrubex-G

Antimicrobial Liquid Handwash
Solution antimicrobienne pour les mains

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Journal

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NEW! IntegraPost

Integrating Core Retainer



Easy to use.

The IntegraPost is easily seated into position using the IP Carrier.

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the easy-flow, non-slump, composite core material is syringed through the patented Flow-Thru-Head®.

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Ultra Passive, Ultra Secure.

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1. Caputo, A., Standlee J.P., "Endodontic dowel retention with resinous cements." J. Prosthet. Dent. 1992; 68: 913-7; 2. Chan F.W., Harcourt J.K. Brockhurst P.J., "The effect of post adaptation in the root canal on retention of posts cemented with various cements." Australian Dental J. 1993; (1) 39-45; 3. Nathanson D., Ashayeri N., "Effects of new technique." J. Calif. Dent. Assoc. Vol. 16 No. 11 1988; 4. Klein, P., "Intracanal Retention Study." Mech. Test. Lab., Univ. of Penna. Patent numbers #5,453,010; 5,507,463. ©Premier, Flow-Thru Head, and "IntegraPost are trademarks of Premier Dental Products Company. Copyright 1997.

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G.L. Lapeer, DDS

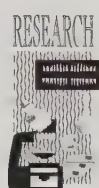


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John P. O'Keefe, B.Dent.Sc., M.Dent.Sc., MBA

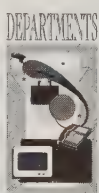


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Journal

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Reality check.

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Now you can produce picture-perfect™ smiles with new Portrait™ IPN® denture teeth—a product created with the help of 2000 laboratories and dentists, possibly even you. After years of extensive customer research, we learned what you wanted in a new, extraordinarily better denture tooth. The result: Portrait IPN anteriors and posteriors.

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To achieve its acclaimed aesthetics, each Portrait IPN anterior tooth blends three different colors in five distinct aesthetic zones. This unique process consistently yields a more natural-looking appearance.

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Portrait IPN teeth match the most popular shades, Bioform® and Vita®. And you confirmed it by saying that Portrait IPN teeth match the Vita Lumin Vacuum shade guide better than or equal to VitaPan® teeth in 14 out of 15 Vita shades.¹

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IPN hardened plastic material mimics the gradual wear of tooth enamel. That's why, in over 10 million dentures, IPN material has been dentistry's choice for long-lasting aesthetics. And why Portrait IPN teeth have a five-year warranty.²

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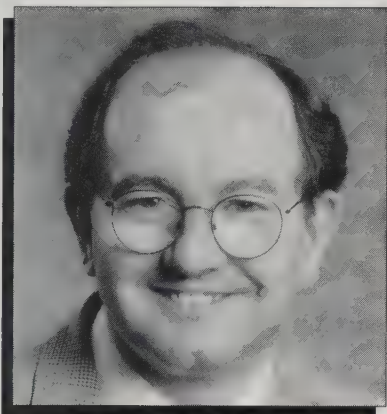
Offering you the full treatment.

Laboratory Division

Portrait IPN®
The world's finest aesthetic denture tooth.

EDITORIAL

IF WE BUILD IT, THEY WILL COME



Dr. John P. O'Keefe

Those of you who saw the 1989 film "Field of Dreams" starring Kevin Costner will likely recall the line, "If you build it he will come". Said in the voice of a ghost, it exhorted the main character to follow an impossible dream, by building a baseball diamond in an Iowa wheat field, against all the odds. The line has stuck with me, and provides an apt metaphor for the provision of dental care in society.

This country has an enviable infrastructure for promoting the oral health of Canadians. There is a partnership between the private and public sectors for the education of dental professionals, the operation of preventive programs such as fluoridation and oral health education, and the provision of dental care. Most dental treatment is provided on a private fee-for-service basis. The profession has essentially made a bargain with society: we will provide the dental care in return for the privilege of self-regulation.

We have built the ball park and they do come in great numbers. Estimates on the utilization of dental care vary from place to place, however, it is safe to state that between 50 and 75 per cent of Canadians visited a dental office last

year. This is laudable, but it means that many citizens, for one reason or another, still don't come to dentistry's ball park. Some can't even afford the tickets for the bleacher seats, others live too far away or can't easily leave their homes, and the park is often not accessible to the non-ambulatory.

The important line for dentistry may be: "If we don't build it, they will go somewhere else." If we dentists don't provide care to these patients, they will receive it from any number of substitute professions, waiting in the wings, which would be only too happy to care for them. The recent history of health care professions has demonstrated a consistent pattern of competition between defender professions like medicine and dentistry, and substitute professions like dental hygiene and nursing (nurse practitioners).

It is not a complex script. The defender professions decide there are certain aspects of their work that can easily be devolved to auxiliary workers. Although the work of the auxiliary is supervised closely at first, with time the supervision becomes more indirect. The substitute profession makes a case for more autonomy, claiming they can do the work and provide the service more cheaply, and that clients find it easier to communicate with them. Governments often find these arguments compelling, and allow substitute professions to expand their legitimate domain of work.

Oral health care is now provided in Canada by dentists, denturists, hygienists and dental therapists. All three of the latter groups are seeking to practice independently of dentists. Hygienists in particular appear to have a very well thought out strategy. Their ultimate aim, it seems, is to become the principal providers of primary oral health care. Getting upset about this strategy won't make it go away. We have the responsibility and the capability to ensure that Canadians receive high quality and appropriate dental care delivered by trusted professionals.

CDA's board of governors approved a new position statement on the delivery of oral health care in September 1997: "The dentist is accountable for the patient's overall oral health care and coordinates delivery because he or she is the only professional qualified by educational preparation to provide a comprehensive differential diagnosis of oral health status, to plan and render treatment and to prescribe or refer specific aspects of treatment. Comprehensive patient oral health care cannot be achieved without coordination by the dentist. Services provided by other oral health care occupations are components of comprehensive oral health care and should not be offered in isolation."

This is a worthy statement that few dentists would disagree with. For it to achieve currency in the broad community, however, we dentists, collectively and individually, have to take certain responsibilities very seriously.

We must do everything in our power to develop the knowledge base of our profession. A profession is differentiated from other occupations by virtue of its complex knowledge base, a fact that the substitute professions invariably use to argue in support of an expansion of their duties. We must encourage the work of university-based dental researchers. Us general practitioners have the responsibility to drive the research agenda, collaborate with researchers, and incorporate their findings in our every day practices.

We also have to demonstrate to society at large that we can be trusted to provide cost-effective care to all sections of the community. We can ensure that people with low incomes, elderly people, Native Canadians and other marginalized citizens receive appropriate care at an affordable price. Society will increase its trust in our profession if we can demonstrate movement on this issue.

John P. O'Keefe
1-800-267-6354 ext. 2297
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Journal

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1998
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No. 3

S Y S T E M S F O R S U C C E S S

CONTROL THE FLOW!

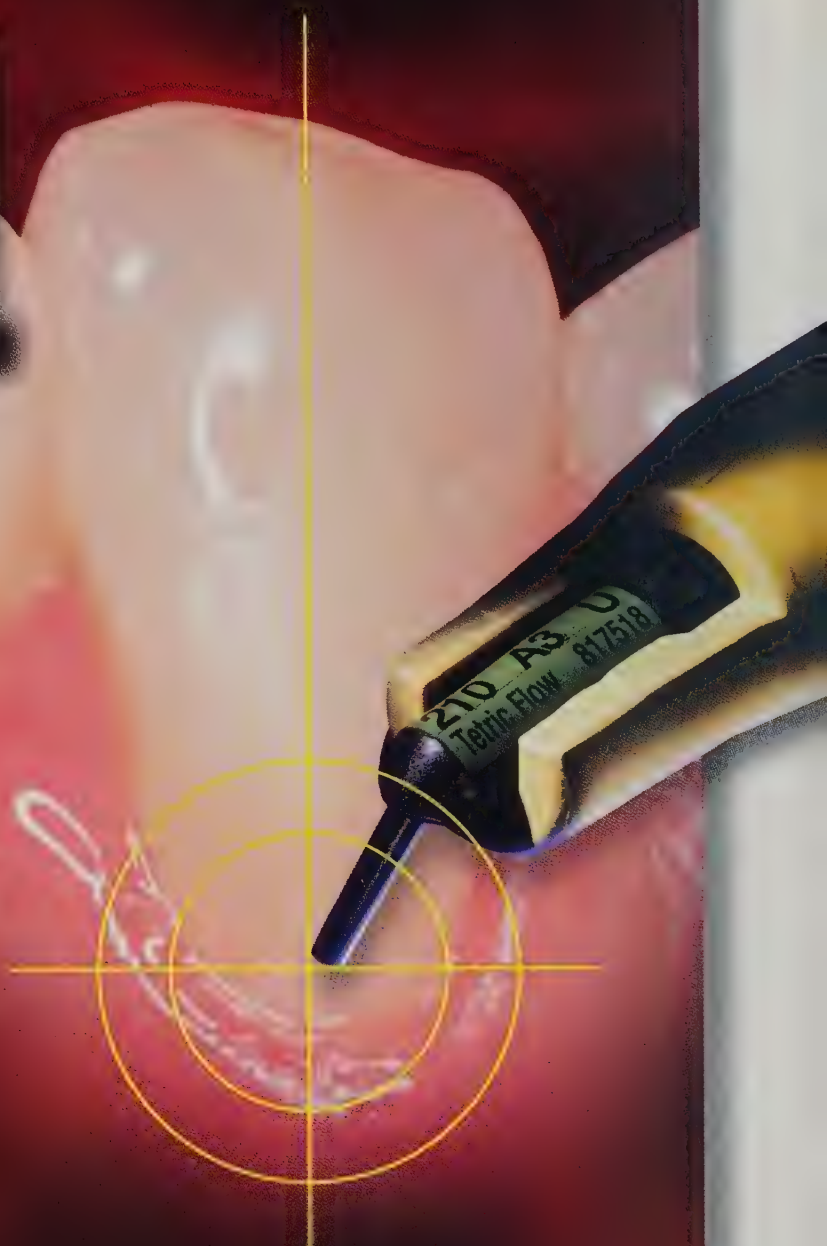
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Dentistry courtesy of Paul C. Beveledere D.D.S



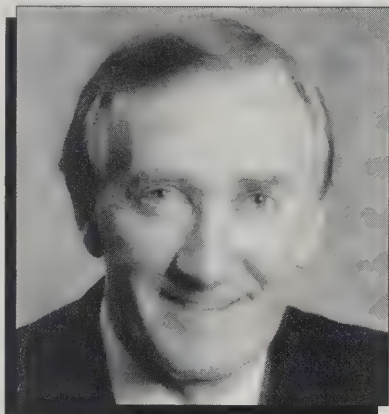
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PRESIDENT'S COLUMN

MEMBERSHIP IS A LOGICAL CHOICE



Dr. Toby Gushue

Spring is traditionally a time of renewal. For dentists, in addition to being the beginning of the lawn mowing season, it is when we renew both our professional memberships and our licences. Particularly for dentists in Quebec and Ontario, however, where membership in CDA is an individual decision, it is also when some of us question the need to join our local, provincial or national dental organizations.

I live in a province where dentists, as a group, have concluded that it is in our collective best interests to be members of both our provincial dental association and CDA. Individually, we don't engage in the annual Spring ritual of deciding whether to join CDA or not, as many of my colleagues in central Canada must do.

If past performance is any indication, approximately half of Ontario's dentists and two-thirds of Quebec's dentists will decide against joining CDA this Spring. Because I don't comprehend how this choice could be made based on a fair and logical decision-making process, I recently tried it myself.

The first factor I considered was my professional status. Being a professional brings with it cer-

tain responsibilities, one of which is to uphold a code of ethics. CDA's code states: "...Dentists have an obligation to participate in the advancement of the profession, support of its professional organizations and to observe applicable Codes of Ethics."

In other words, dentists have an obligation to belong to CDA. I could take no pride in stating that I was a nonmember, because it would clearly indicate that I was not following my profession's code of ethics.

Next I considered the cost of membership. But when the cost of membership in CDA is equivalent to the cost of buying two cups of coffee each working day for a year, surely it can't be the factor that's keeping dentists in Ontario and Quebec from joining CDA.

It is true that these are difficult times in dental practice, and that some dentists are not as busy as they would like to be. But if 100 per cent of the dentists in Atlantic Canada, the Prairies and British Columbia can afford to join CDA, why can't all of the dentists in our two largest provinces also do so?

My next thought was about value. I told myself that we are living in a "me first" society, where dentists are demanding real value for their membership dollar. The question that determines the answer to their annual Spring decision may well be: What has CDA done for me lately?

But as anyone who reads the *Journal* and *Communiqué* knows, CDA has done a lot for every dentist in Canada lately — including those who are not supporting the association.

Every time I complete a dental claims form for a patient, I use procedure codes that CDA developed and maintains. CDA also designed the claims form. Without these two basic tools, providing treatment to my patients would be an administrative nightmare.

CDA also developed CDAnet, which has allowed dentistry to maintain control over the electronic transmission of dental claims. If I were required to use different networks to transmit

claims to different claims administrators, or to pay a fee for each transmission, as my colleagues in the U.S. are, my variable costs would increase dramatically.

All dentists should be aware of CDA's successful campaign to preserve the federal tax exemption on employer-sponsored health and dental plan premiums. Before we decide not to join CDA, we should ask ourselves how our practices would have fared if the government had removed this exemption, and dental plans had collapsed.

CDA has also encouraged the federal government to maintain RRSP contribution limits at a level that allows self-employed Canadians to enjoy a comfortable standard of living in their retirement years. It's our future that is at stake.

Working with the provincial dental associations, CDA has fought managed dental care to a virtual standstill in Canada. If I had been forced to discount my fees by 12 per cent or more, what impact would it have had on my bottom line?

CDA also brought reason back to the debate on dental amalgam, and encouraged Health Canada to develop a scientifically-based policy on the use of amalgam. If the use of amalgam had been restricted, what impact would it have had on my practice and my patients?

On dentistry's behalf, CDA is working diligently to ensure that science — not public opinion — prevails in the ongoing debate over hepatitis B and the potential transmission of hepatitis B from dentists to patients.

The list of the many activities that CDA is doing on behalf of all the dentists in Canada goes on and on. It therefore should come as no surprise that, no matter what decision making process I use, the results are always the same: There is value in CDA membership, and I am very proud to be a member of my national professional association.

Toby Gushue, BA (Ed.), BA, DDS
President of the Canadian Dental Association

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LETTERS



CDSPI, The Disability Insurance Claim Process and You

Notwithstanding Dr. William Leggett's rather lengthy dissertation on disability insurance, he is quick to cover himself and Canadian Dental Service Plans Inc. (CDSPI) with many laurels, while at the same time criticizing those who submit claims (Leggett, W. CDSPI, the Disability Process and You. 64:13-14, 1998).

I am not interested in foofaraw, smoke, mirrors and Walt Disney fairy tales. I want to hear about the real thing and nothing but the real thing. I suspect most of my colleagues feel the same.

What am I referring to? Let me paint you a picture.

In the August 1997 edition of *Oral Health*, Dr. Murray Chantler wrote a scathing report on the actions of the CDSPI and SunLife Insurance. He certainly had no laurels to bestow on either one. Why doesn't Dr. Leggett address this real life case and give his opinion, or his and CDSPI's side of the story, instead of concentrating on how wonderful CDSPI represents dentistry in Canada.

Come down to earth Dr. Leggett, and tell it like it is.

*Lawrence I. Gaum, DDS, FADSA
Toronto, Ont.*

Every day, I am very grateful that our profession has Canadian Dental Service Plans Inc. (CDSPI). Being able to practice our profession is something that we all generally take for granted. I did, until I was on my way to work March 14, 1984. A freezing rain storm, my car skidding out of control, and a head-on collision with a

gravel truck changed everything. The initial treatment plan was for amputations. The surgeons did manage to save my legs and arm, but despite six agonizing months in hospital and many surgeries over the years, I am still in a wheelchair most of the time and unable to stand or walk unassisted. I will be eternally grateful to my surgeons, my colleagues, my friends, and to CDSPI for being there. The accident was deemed to be so severe as to be non-survivable and, believe me, despite chronic disabling conditions, I count my blessings every day.

CDSPI assisted my wife when she needed help the most by facilitating the submission of the documents needed by the insurance company to determine claim eligibility and to expedite claim payment. Both they and my insurer were, simply put, a godsend. I cannot imagine the additional agony that I would have suffered had financial distress been added to my virtually hopeless medical condition.

As most readers will realize, CDSPI is not an insurance company. They are an organization, "owned" and controlled by CDA and the provincial corporate bodies, to act on our behalf by making available to us the very best insurance packages for our needs as dentists. They have no commissioned salespeople who have a vested self interest in selling a product; the profession is their only client. They act as an intermediary between the dentist client and the insurer in what I believe to be a very effective manner.

Having been through so much trauma myself, I became involved in a volunteer capacity with the Ontario Dental Association's dentist at risk committee, and can tell you that many disabled, chemically dependant and professionally burnt-out dentists were assisted by CDSPI staff when they needed assistance the most.

I have been involved in organized dentistry for 27 years, and believe that I understand the relationship of CDSPI to the dentist

and insurance company. CDSPI cannot approve or reject claims. Only the insurance company, which is completely separate from CDSPI, can do that. The board of CDSPI (composed of dentists), with input from CDA and the provincial dental associations, simply selects the group insurance company and coverages available. They then act as intermediaries between the insured dentist and the insurance company. They also encourage and assist the insured and insurer in resolving any difficulties. If for any reason this board of dentists becomes unhappy with a given insurance company, they may either select another insurer for our group, or negotiate another more appropriate package of insurance. This is a lot more clout than the average individual insurance agent has with the insurer. We owe a lot to the dedicated dentist volunteers who act on our behalf on the board of CDSPI.

From my own experience, I would urge all dentists to examine their level of coverage today, while you are still healthy. We provide exemplary preventive checkups for our patients — let's do it for ourselves.

*Robert A. Brandon, DDS
London, Ont.*

A great deal of ink has been spilled in dental journals recently over allegations by Dr. Murray Chantler with respect to general coverage for disability insurance through CDSPI.

What should be readily apparent is not the coverage, lack thereof, or role of CDSPI, but rather the very fact that the insurance companies lack accountability.

I note with irony that those who were denied coverage appealed directly back to the company that initially denied liability. Short of costly civil litigation, there is no recourse against an insurer who decides to deny claims.

Until such time as each province has a provincial regulator charged with the responsibility of protecting the public from the



industry (similar in scope to the role of the dental regulating bodies), there will be no general accountability for the insurance industry.

I doubt whether any member of CDA could secure the resources to take on the legal department and resources of any major Canadian insurer.

R.D. Speers, DDS
Toronto, Ont.

Why I Won't Renew My CDA Membership

I am writing to you today probably for the last time. I have no intention of renewing my membership for 1998, although I have been a member of CDA ever since I graduated in 1980. I always thought we had to support the authorities representing us at the national and provincial levels. But when our association is not interested in our opinions, and represents only a section of its membership, then I must draw the line, and decide not to belong to it any more.

When I received the promotional material announcing the August 1997 CDA Convention, I was astounded to see that the guest speaker was Diane Francis. Then I noticed there were no French-language lectures in the program. I wrote a Letter to the Editor, asking specifically that it be published in June, and made sure that I met the publication deadlines. I also sent a copy of my letter to the CDA president. Nobody acknowledged receiving my letter. About two months later, I received a response from CDA president Dr. Barry Dolman, who stated that CDA could not be reproached for using this speaker, that she was not saying malevolent things, and that the Convention program included a series of speakers (albeit anglophones only) approved by the representatives of each province.

In substance, my letter to the editor said that Diane Francis has a reputation for putting down French-speaking Quebecers, and misinforming English Canada by saying that Quebecers are xenophobic, ignorant and fascist. She belongs to the lineage of the Mordecai Richler and Howard

Galganov. No need to comment on their words. No one should be surprised that Diane Francis found no Quebec publisher willing to publish the French version of her book. Having her on the program as the keynote speaker at our national association's Convention was a supreme insult to Quebec. I am not the only dentist with this opinion. I know that the choice of this speaker raised a lot of concern in Quebec and that CDA received protests from people other than me, including the leadership of the Ordre des dentistes du Québec (ODQ).

But what frustrates me most of all is the fact that you did not even deign to publish my letter in the *CDA Journal*. It made me understand that the information in the *Journal* is filtered, and that a letter that could harm our sacrosanct national unity would not be published. Once again, the message was sent to Quebec that it was paranoid. That if we are reacting to the anti-Quebec, anti-French speeches of the hysterical editor of the *Financial Post* it is because we are too susceptible. And that if she spoke of anything other than Quebec, then nothing could be said against her. Possibly, Ernst Zundel would also have an interesting theme to develop in a national conference. After all, everyone is entitled to his own opinions, regardless of his past allegiance. But I bet that the Jewish members of the organizing committee would not accept that, and they would be right. So explain to me why we treat differently an openly anti-Québécois speaker?

I am sure that the main reason why Diane Francis was not replaced is the bureaucratic inertia of the Convention organizing committee. It would have been complicated to work out a last minute arrangement, and not changing the program was a much more simple choice. And after all, only a few isolated, agitated members in Quebec stood up (including ODQ). Let us smother the incident, and within a few months nobody will talk about it... You may be right in your analysis of human nature. But if you had the least respect for the Quebec audience, you would have

taken the steps required to buy back Ms. Francis's contract.

I represent some of those agitated Quebecers who did not appreciate the Diane Francis incident. But before I make a clean breast of it, and bow out, I insist on explaining myself. More and more Quebecers will not tolerate being publicly flouted like this. English Canada will have to start turning on their lights and respecting their national minority, as long as we remain one. The tendency to retort, rather than being diminished without answering back, is increasing. I propose that you invite Pierre Bourgault to be a speaker at a coming CDA Convention to be held in Quebec. He will be able to talk about the new political and social tendencies in Canada over the last few years, as Ms. Francis did last summer. After all, he is an excellent speaker whose reputation is established. I, for one, predict that this will not be accepted by the organizing committee. I believe Quebecers are more respectful of the sensitivities of Canadians than the other way around. In our complex of colonized people, we are constantly afraid of hurting others. And we will never have the idea of qualifying anglophones as paranoids if they oppose the choice of Pierre Bourgault. For us, it will be quite natural.

That is why I will not renew my CDA membership. To my surprise, you have finally decided to publish my letter and an english version to boot. This is more than I ever expected. Let us hope this will diminish the gap between the "two solitudes" and that in the long run, plan A will triumph over plan B.

Jacinthe Larivée, DMD, Cert. Paro.
Montreal, Que.

Editor's Response

I am greatly concerned when a long-time member decides not to renew membership in her national professional association. Given all the external pressures on our profession at present, this is a time when we have to celebrate what we share as dentists, rather than accentuate our differences.

My personal commitment is to provide a forum for Canadian dentists to express their opinions in the

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pages of the *Journal*. I believe in freedom of expression, as long as letters to the editor or opinion pieces pertain to the practice of dentistry, are respectful in tone, and don't violate the law. Responsible discussion of matters relevant to our profession benefits us all.

My Vision For the Journal

This letter is written in response to your recent editorial asking readers what should be part of the *Journal* (O'Keefe, J. [Editorial] My Vision For the Journal: Please Tell Me What You Think. *J Can Dent Assoc* 64:7, 1998).

Your ideas to reduce overlap in CDA publications, and bring more electronic communication into the loop are welcome indeed. However, I do not agree that "high-priced gurus," presumably from elsewhere, are not necessary, and that any important information can and should be gleaned from courses taught "close to home," I suppose meaning inside Canada.

There are some very fine lectures presented in Canada, but all dental knowledge is not circumscribed by our borders. Many first-rate lecturers come from outside this country to present their lectures. However, many international lecturers limit their visits here because of all the hassle with our heavy-handed government. Some lectures containing very valuable information can only be attended outside of the country.

Your statement that you can get just as much useful information from your local study club or a literature search as you can by attending one of these "high-priced guru's" presentation is naive. Why should we be experimenting with products on the unknowing public when we could attend a course and find out what someone else discovered with his experimentation. It doesn't matter where the lecturer comes from, and I don't really care how much he is paid. Truth is truth, wherever it was authored.

Many practitioners want to attend a dental course in a place they would like to visit. There's no shame in that, especially when Revenue Canada has placed severe restrictions on what can be

claimed as a deduction in conjunction with continuing education. So go ahead, print your showcase of Canadian clinicians slated to speak at CDA conventions, and why not include a showcase of those presenters who are not Canadians? But print it with the attitude of an eagle, not the attitude of an ostrich.

As to what should be printed in the *Journal*, social science research is of very limited value. Studies showing the prevalence of sealants among certain age groups of children provide nearly valueless information. Tell us which sealants stay on the longest and if there is any scientific validity in the claim of fluoride release of some of the materials. Research done on animals is utterly useless to nearly all of us who are private practice dentists, unless we are intending to apply it in a veterinary clinic. Let's see human research done with current products, and let's see the brand names of the products clearly identified. Let's also see a profile of who did the research and who funded it.

Michael G. Christensen, DDS
Kenora, Ont.

Editor's Response

I understand the distinction between vacations and learning, as well as the importance of each to the busy dental professional. The literature on adult learning identifies at least four distinct learning styles. I speculate that Dr. Christensen and I don't share the same learning style. I still believe that as adults we learn best when we become actively involved in seeking useful information. My original point related to learning.

From what I have been hearing since I joined this organization, some of the people "on the circuit" charge very high fees and some conference organizers feel they are often paying for big name entertainment rather than high quality education. I certainly am not naive enough to believe that big name speakers have a monopoly on the truth. How about lecturers digitally enhancing their slides to promote their version of the truth?

Anyone who knows me would not accuse me of being a narrow

nationalist. My primary professional concern is the future of the profession of dentistry. I want the best quality knowledge to appear in this journal, whatever its origin. I also know that Canada's dental profession doesn't have to take a back seat to that of any other country in the world. I will never be ashamed to say that I went out of my way to disseminate the very best work of Canadian clinicians and scientists to the whole world.

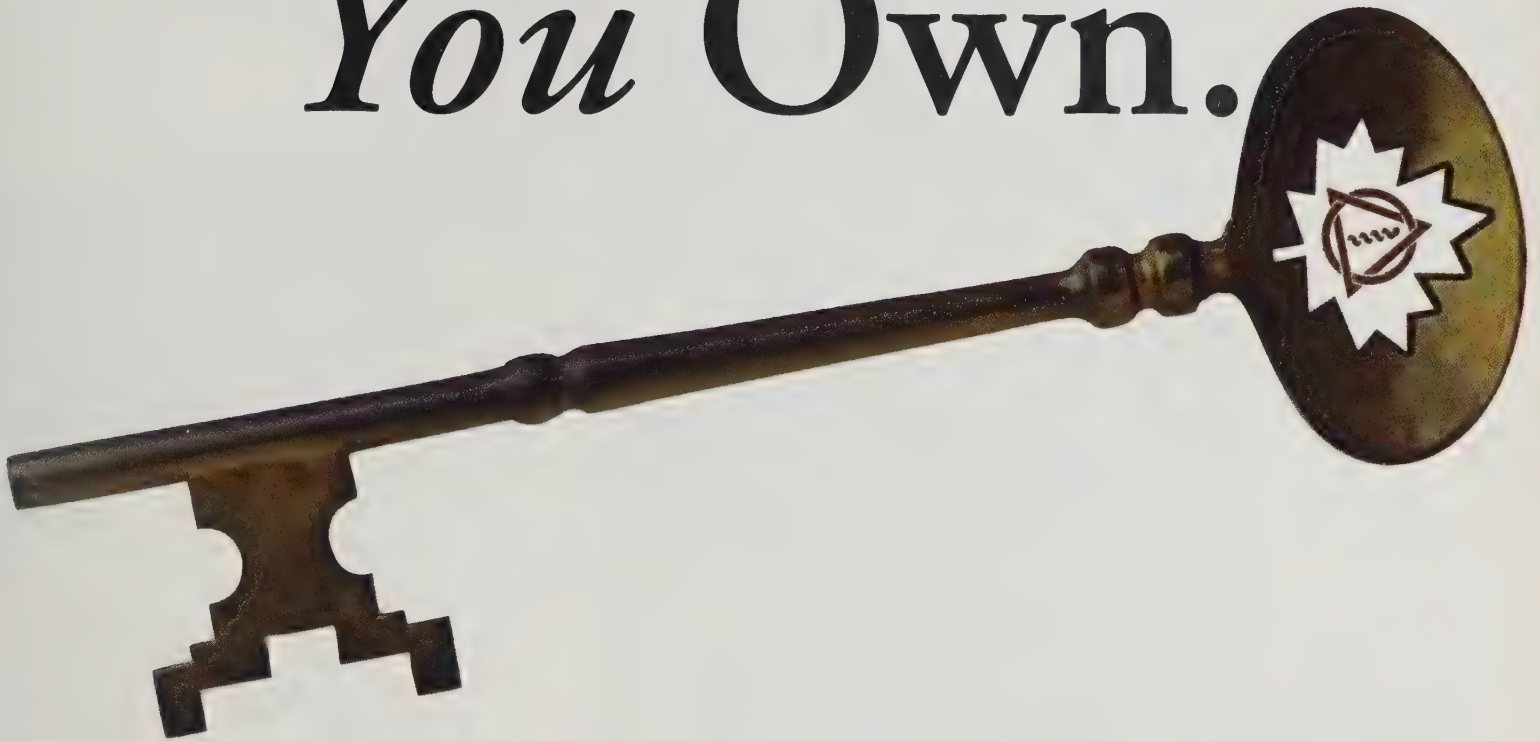
I'm happy to hear that the CDA *Journal* will be taking a new direction. The *Journal* should be first and foremost a resource for scientific research. The "news" should be in a very distinct section. I don't think that it is necessary to eliminate the news about the profession or its personalities. In fact, unless a subject must be communicated very quickly to the membership, the *Journal* should be the only communications vehicle that CDA requires. Graphically, this news area should be distinct from the scientific area.

As far as research articles are concerned, it may be necessary to do some public relations and marketing to researchers not only in Canada, but also in the U.S., Japan and Europe. Once more and more clinically significant original research articles appear, the *Journal* will grow into an even more significant publication. As an associate member of the American Dental Association (ADA) and reader of various dental journals, I view the *Journal of the American Dental Association (JADA)* as the standard for any national organization.

Don't adopt the uniquely Canadian attitude that anything American is inappropriate for Canada and therefore not worth trying. Look at JADA. It has taught me a lot in my past editorial work for the Essex County Dental Society newsletter. Run monthly guest articles by a prominent Canadian (à la Gord Christensen) who surveys the standard of treatment in various fields of dentistry.

Pat Duronio, DDS
Windsor, Ont.

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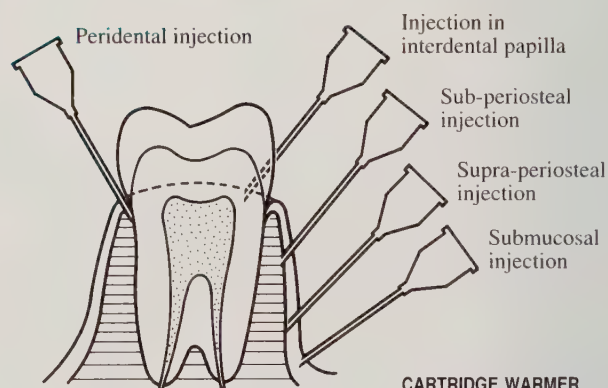
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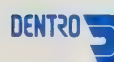
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I wish to congratulate you on the positive changes you have affected in the *CDA Journal*. The professional image you are portraying in the *Journal* is a breath of fresh air in the rather poor field of dental journals available here in Canada. The elimination of stark commercialism in the *Journal* adds considerable weight to the value of both CDA and, of course, your publication.

Please keep up the good work, which I am sure can be very difficult at times. Your efforts are certainly noticeable and appreciated.

Peter Stutman, B.Sc., DDS, MDS, Cert. Prostho.

Editor of the Journal of the Association of Prosthodontists of Canada, and "Front Line"

Journal Advertising

No doubt the back cover ad for Listerine helped pay a lot toward the cost of producing the *Journal*, but are their claims "entirely true and credible"?

I suggest a peer review system to eliminate all advertising unless 100 per cent true — no matter how much they pay.

*Donald Beauprie, DDS
Deep River, Ont.*

Editor's Response

*Dr. Beauprie raises a very interesting point that warrants further exploration and could generate much heated debate. Ideally, we should be able to follow his advice. My understanding is that all advertisements promoting products which have been awarded the CDA Seal of Recognition are subject to review. Prior to this, CDA had an editorial board that set editorial and advertising policy for the *Journal*.*

*Let me pose a hypothetical question. Let's pretend for a minute that no advertisement is 100 per cent true. How could we support the publication of the *Journal* if we refused to accept advertising, given that 75 per cent of its revenues come from the pockets of advertisers? I would like the readers to send me their opinions on this fundamental issue.*

Letters may be edited for space and clarity, at the discretion of the editor.

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Dalacin® C capsules

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The recent edition of the Sanford Guide to Antimicrobial Therapy 1996 recommends
 "Dalacin® C Capsule as

First line antibiotic for empirical therapy of Odontogenic Infections^{1†}



Empirical Antimicrobial Therapy on Clinical Grounds¹

(¹Optimal antimicrobial therapy is based upon accurate indications and susceptible testing of casual agents; these are only "INITIAL" guidelines)

Anatomic site/Diagnosis/ Modifying circumstances	Etiologies (usual)	Suggested Regimens [*]		Therapeutic Measures and Comments
		Primary [*]	Alternative ⁺⁺	
Odontogenic Infection	Oral microflora	Clindamycin 300 mg q6h po	Erythromycin 500 mg q6h po or AM/CL ⁺⁺⁺ 500/125 mg bid po	[†] Surgical drainage and removal of necrotic tissue essential. β-lactamase resistant organisms are increased in frequency.^{**}

+ : Dosages suggested are for adults, with clinically severe (often life-threatening) infections. Dosages also assume normal renal function, and not severe hepatic dysfunction.
 ++ : Alternative therapy includes these considerations: allergy, pharmacology/pharmacodynamics, compliance, local resistance profiles.
 +++ : AM/CL = amoxicillin/clavulanate

Adapted from Sanford 1996

^{*}Penicillin, which was the antibiotic of choice for a long time, induces the production of β-lactamase by certain anaerobes, specifically *Bacteroides* species, and clinical failures have been increasingly reported in the literature.²

^{**}In Canada, most *Bacteroides* species are resistant to Penicillin.³

^{*}Dalacin® C capsule is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *Bacteroides* species, *Peptostreptococcus*, anaerobic *Streptococci*, *Clostridium* species and *microaerophilic Streptococci*. Also indicated in serious infections due to sensitive gram-positive organisms (*Staphylococci*, including penicillinase-producing *Staphylococci*, *Streptococci*, and *Pneumococci*) when the patient is intolerant of, or the organism is resistant to other appropriate antibiotics. ^{*}Dalacin® C capsule is indicated for prophylaxis against α-hemolytic (*viridan* group) *Streptococci* before dental, oral and upper respiratory tract surgery.

Most commonly reported side effects are diarrhea (2.6%) and vomiting (1.6%). For warnings, please refer to the prescribing information.

• 150 mg capsule: available on all provincial formularies. 300 mg capsules: available on the following provincial formularies -- Ontario, Quebec, British Columbia, Alberta, Saskatchewan, Manitoba, Nova Scotia, Newfoundland.





Personal Problems? The Members' Assistance Program Can Help

As stress takes an increasingly high toll on the mental health of North Americans, the bad news for dentists is that they may be particularly at risk. The good news is that dentists can do something about it, by using services such as the Members' Assistance Program offered through the Canadian Dentists' Insurance Program.

It's clear from the statistics that everyone has a good chance of facing a serious mental health problem at some point in their lives:

- One Canadian in five will likely suffer from a mental illness at some time in his or her life, and one in 10 from depression.
- About five per cent of working people suffer from depression in any given year; seven per cent of adults have serious alcohol-related problems; and a further six per cent suffer from drug abuse or dependence.
- About 20 per cent of the people seeking a doctor's care are suffering from an anxiety- or stress-related ailment.
- The personal and social costs of untreated mental disorders are similar to those of heart disease and cancer.

There's not a lot of hard information about how dentists fit into

this picture, but what there is suggests that dentists may be in more jeopardy than others. For example, a European study found that about half of all dentists experience occupational stress that interferes with their performance, while a U.S. report states that suicide rates among dentists are almost double those of other professionals. About a fifth of all dentists who receive benefits under the Canadian Dentists' Insurance Program's disability plan are away from their practice because of a mental or nervous problem.

Why are dentists so susceptible to such problems? Although every dentist's situation varies, there are some general factors that may set the profession apart. In addition to assuming responsibility for their patients' oral health, many dentists also take on all the business responsibilities that come with owning a practice. Many work long hours under high pressure, and are dealing with high overheads and debt. The combined stress from all these factors may result in depression, anxiety, increased alcohol consumption, fatigue or physical problems such as ulcers or insomnia.

The situation is far from hopeless, however. Provided appropriate treatment is readily available,

and sought out, the American Psychiatric Association estimates that 80 per cent of people suffering from mental illness can effectively return to normal, productive lives. Getting help with personal difficulties — preferably before they have a chance to grow into more serious problems — is one of the key steps in this process.

In many cases, provincial dental associations provide services (such as dentists at risk programs) to help dentists deal with their personal problems. These programs often provide extensive support in major areas such as substance abuse.

Another useful service is the Members' Assistance Program (MAP), which provides free personal counselling and related support services to all participants in the Canadian Dentists' Insurance Program. (A participant's spouse and dependent children are also eligible for this service.)

MAP is designed for people who want assistance when personal situations are negatively affecting their family life, work life or general well-being. Participants can phone the MAP 1-800 number toll-free, 24 hours a day, seven days a week to speak with a professional counsellor.

Under this national program, short-term face-to-face or telephone counselling, as well as advice and information, are provided by experienced professionals. MAP provides dentists with immediate access to psychologists, social workers, addiction counsellors, financial counsellors and lawyers. These professionals will help you for a few sessions at no cost. If you need further counselling, they will then direct you to other professionals who can help you to resolve more complex or longer-term problems at their usual fee.

The MAP service is totally confidential. No information is shared with anyone outside the program.

MAP can assist you with a wide range of personal issues, including:

- Couple and marital relationships
- Family and parenting matters
- Work-related and career issues

- Stress and anxiety
- Depression
- Child-care concerns
- Aging family members
- Financial and legal matters
- Misuse of alcohol and drugs
- Bereavement

In addition to providing counselling for emotional problems that callers are experiencing, MAP also provides information about various services that can help dentists reduce stressful situations. For example, the program can provide information about local daycare programs or eldercare support services.

MAP is operated by CHC, a national employee assistance firm.

"Employers have long known that using assistance programs results in happier and more productive employees," says CHC's Terry Parsons. "More recently insurance companies have realized that pro-

viding this free counselling service can mean lower incidences of insurance claims."

That's good news for all participants in the Canadian Dentists' Insurance Program. When there are fewer claims in group plans like those offered under the program, the resulting premium surplus is used to benefit all participants in the plans (unlike the situation with private plans, where any surplus goes to the insurer). This can help keep premiums low, or allow surpluses to be distributed directly back to plan participants.

Personal problems can't always be avoided. But the negative impact they have on your life can be minimized by getting the assistance you need to deal with those problems. For information on the MAP program or its 1-800 number, phone CDSPI. ■

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Common Stock Fund (Altamira)	0.0%	9.8%	10.4%	9.0%
Canadian Equity Fund (Trimark) ^{††}	3.2%	16.2%	16.2%	13.2%
Special Equity Fund (KBSH)*	31.4%	42.2%	36.1%	n/a
International**				
Emerging Markets Fund (KBSH)	-32.0%	-13.4%	n/a	n/a
European Fund (KBSH)	23.1%	18.7%	n/a	n/a
International Equity Fund (KBSH)	6.4%	10.2%	n/a	n/a
Pacific Basin Fund (KBSH)	-1.4%	7.1%	n/a	n/a
US Equity Fund (KBSH)*	29.0%	27.1%	19.6%	17.6%
Global Fund (Trimark) ^{††}	19.1%	18.4%	19.4%	17.8%
CDA INCOME FUND				
Bond & Mortgage Fund (Canagex)	7.4%	11.9%	9.2%	10.0%
CDA CASH AND EQUIVALENT FUND				
Money Market Fund (Canagex)	2.8%	4.8%	4.8%	7.3%
CDA GROWTH AND INCOME FUND				
Balanced Fund (KBSH)	10.6%	15.7%	12.0%	10.4%

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historical rates based on past performance and are not necessarily indicative of future performance.

^{††} The rates of return shown for the Canadian Equity Fund (Trimark) and the Global Fund (Trimark) are based on the returns of the Trimark Canadian Fund and the Trimark Fund respectively, the mutual funds in which those CDA funds invest. Returns are historical and are after deduction of management fees. As a result, the performance results differ from those published by Trimark Investment Management Inc.

* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

** These funds are subject to foreign content limitation.

For current unit values and GIC rates call CDSPI Toll-Free at 1-800-561-9401, ext. 525 or visit the CDSPI website at www.cdspi.com.



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NEWS UPDATE

Colgate To Become Exclusive Sponsor Of SLSA Program

Colgate-Palmolive Inc. will be the exclusive sponsor of the Self-Learning/Self Assessment (SLSA) program for the next three years.

Under the terms of an agreement reached in January, Colgate will provide CDA with program funding over a three-year period. In return, the association will continue to publish the popular SLSA program in the *Journal*, and provide Colgate with complimentary advertising space to promote its oral care products.

"We're very pleased that Colgate has taken this initiative," said CDA's director of communications Miss Linda Teteruck. "From what they've told us, dentists enjoy the SLSA program and find it particularly useful. It's a way for them to increase their dental knowledge — and earn additional continuing education points — without taking up valuable practise time. But given our commitments in other areas, it would have been very difficult for CDA to continue this initiative without external support."

SLSA is owned and operated by the SLSA Corporation, which formulates the questions, answers, and rationales used in the program. The funding provided by Colgate has allowed CDA to acquire the exclusive Canadian publication rights to the SLSA program until June 2001.

"As worldwide leaders in the development of oral care products, Colgate-Palmolive Inc. is a strong supporter of continuous improvement and continuous learning," said Dr. Gordon Nikiforuk, Colgate-Palmolive Inc.'s professional relations manager. "Our sponsorship of the SLSA program is a logical extension of this philosophy, because the program offers Canadian dental practitioners the opportunity to continuously fine-tune their education concerning the latest developments in dentistry."



Miss Linda Teteruck, CDA's director of communications

"In addition, Colgate-Palmolive Inc. believes that the SLSA program is of significant value because it offers dental professionals a convenient — and enjoyable — way to earn continuing education credits. By simply reading publications such as the *CDA Journal* and the *Colgate Oral Care Report* to keep abreast of the latest findings in dentistry, and participating in the annual SLSA quiz, dental professionals across Canada can earn valuable continuing education credits."

Colgate-Palmolive Inc. was one of the original five sponsors of the SLSA program. The new sponsorship agreement allows the corporation to maintain and broaden its links to the program, and CDA.

Although the agreement with SLSA's initial sponsors does not expire until June of this year, Colgate will begin providing new funds for the program this month. This will allow the SLSA Corporation to begin developing new questions, answers and rationales for the 1998-99 program year. ■

CDA Journal Sponsors 1998 DIAC Survey

CDA will publish the Dental Industry Association of Canada's (DIAC) 1998 survey in the April issue of the *Journal*.

The four-page survey, which questions dentists on the types of materials, instruments and equipment they prefer, will be accompanied by a message from DIAC's president, Mr. Cy Elborne.

"We wanted to say thank you to the dental manufacturers and suppliers who advertise in the *Journal*, and this seemed like a good way to do it," said Dr. John O'Keefe, the editor of the *Journal*. "We will typeset and print the insert at our cost, while DIAC will print and supply postage-paid envelopes. Dentists will benefit by having the opportunity to express their views, DIAC will benefit by being able to conduct its survey at a reasonable cost, and we will benefit by being able to give Canada's dental manufacturers and suppliers something back for all the support they have given to the *Journal* over the years. It's a win-win-win situation."

The survey will appear in both the English- and French-language editions of the *Journal*. ■

CDAnet Update

CDA is reminding dentists that an Explanation of Benefits (EOB) or Claim Acknowledgment form must be printed in their office following the successful electronic transmission of a dental claim over the CDAnet system.

"This is one of the most important steps in the claims transmission process," said Mr. James Gagnon, CDA's director of practice management support services. "If the office software will not produce an EOB or Claim Acknowledgment form, the dentist should contact his or her software vendor as soon as possible."

CDAnet requires dentists to provide an EOB or Claim Acknowledgment form to patients at the conclusion of their appointment, before they leave the dental office. Dentists should check with their staff to ensure this is occurring.

An EOB or Claim Acknowledgment form informs patients of the treatment they received and its total cost. Keeping patients informed encourages them to be responsible consumers of dental care.

In January, CDA announced that Empire Life would be joining CDAnet in the near future. This is

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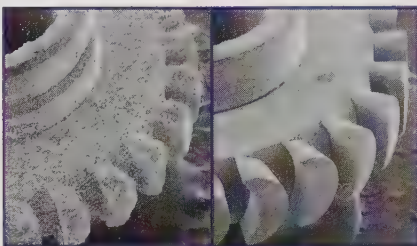
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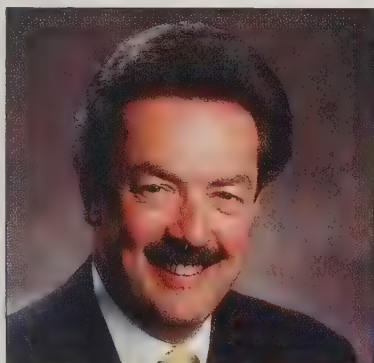
now a reality. As of February 1, 1998, Empire Life began accepting claims electronically for participating employer groups.

Dentists sending claims electronically to Empire Life will require the following information:

- Carrier ID #: 000033
- Network: NDC or ACE

The Empire Life policy/plan number is alphanumeric, and five characters in length. The first character is alpha, and is capitalized, followed by four numeric characters. Leading zeros should be entered, for example: G0001

The division/section number is mandatory, alphanumeric, and three characters in length. It may be all numeric or a mix of numbers and letters. Leading zeros should be entered, and any alpha character capitalized, for example: 001 or 01A.



James Gagnon, CDA's director of practice management support services

Similarly, the Certificate Number is numeric and nine characters in length. Leading zeros should be entered, for example: 000000001.

Dentists who require assistance entering the Carrier ID number into their system, should contact their software vendor. For questions pertaining to a claim, contact Nathalie Najen, Empire Life's customer service representative, at (613) 548-1890, ext. 3027.

To inform participants about changes to CDAnet, and help them to adhere to the standards established for electronic claims transmission in Canada, CDA communicates regularly with plan carriers, insurance networks, and dental offices. Information on CDAnet is also provided in the *Journal* and *Communiqué*. ■



Place Jacques Cartier (old Montreal) [20" X 24", oil on canvas]

Cover Artist: Pierre-Yves Lamarche

Born in Montreal in 1930, Pierre-Yves Lamarche is a respected artist and dentist. A 1957 graduate of the University of Montreal's dental faculty, he has also studied under various well-known painters and taken part in their workshops.

Dr. Lamarche practised dentistry for more than 17 years in Montreal prior to his recent retirement. During that time he served as the executive director of the Order of Dentists of Quebec (1976-1995), and as the assistant director general of Montreal's Sainte-Jeanne D'Arc Hospital (1967-1974).

Today, Dr. Lamarche completes more than 50 oil paintings a year, including portraits, city scenes, still lifes and landscapes. His work has been exhibited in Quebec and France, and featured in several prominent art magazines.

Dr. Lamarche is also a sculptor and poet. He was presented with CDA's Distinguished Service Award in 1992. ■

RCDC Seeking New Fellows

The Royal College of Dentists of Canada (RCDC) is now accepting applications for charter fellowship in the newly created specialty of oral medicine and oral pathology (oral medicine).

To apply, dentists must have successfully completed a 24-month graduate program in oral medicine (or its equivalent) at an institution accredited by the Commission on

Dental Accreditation of Canada or its U.S. equivalent, and either completed the American Board of Oral Medicine examination or the specialty examination in oral medicine of the College of Dental Surgeons of British Columbia.

Candidates will also be considered if they are certified as a specialist in oral medicine by the dental licensing authority of a Canadian province where oral medicine is recognized as a specialty (e.g. B.C.,

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Quebec, Saskatchewan); can demonstrate evidence of a minimum of four years of training and practice in oral medicine from the beginning of their training program; and successfully complete a structured questionnaire addressing their educational and professional experience.

Dentists wishing to apply for fellowship should request an application from the RCDC office at 365 Bloor Street East, Suite 1706, Toronto, ON M4W 3L4, or call (416) 929-2722. ■

Memorial Fund Established For Father Of CDA Past-President

A special memorial fund has been established in honor of the late Mr. Ed Holmes, the father of CDA past-president Dr. Bradley Holmes.

The fund will be used to develop a modern dental treatment facility at the Pinecrest Home for the Aged in Kenora, Ontario. Mr. Holmes was a former member of the home's board of directors, and Dr. Holmes was its dentist for many years.

Dentists wishing to contribute to The Ed Holmes Memorial Clinic should send their donation to: The Pinecrest Home For the Aged, 1220 Valley Drive, Kenora, ON P9N 2W7. Tax receipts will be issued. ■

Appointments

Toronto Dentist Elected as Secretary/Treasurer Of AAPHD

A Toronto public health dentist has been elected secretary/treasurer of the American Association of Public Health Dentistry (AAPHD), becoming the first ever international member to serve as an officer of the organization or a member of its executive council.

Dr. Patricia Main was elected to the AAPHD secretary/treasurer position for a three-year term. She is currently president of the Canadian Association of Public Health Dentistry, as well as president of the Ontario Association of Public Health Dentistry.



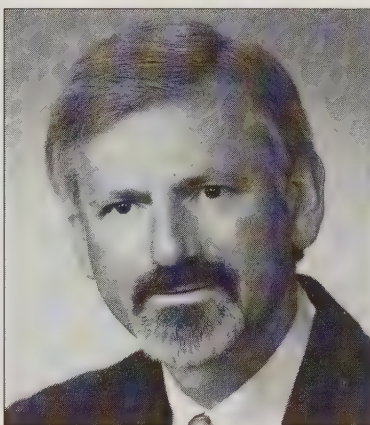
Dr. Patricia Main

"I was delighted both to be nominated and then elected to the post," said Dr. Main. "It reflects the interest shown by the American public health members in the strengths of Canadian public health, in evidence-based practice, and in guideline development." ■

Ontario Dentist Installed as President Of GLAO

A Mississauga, Ont., dentist has been installed as president of the Great Lakes Association of Orthodontists (GLAO).

Dr. Paul C. Levin was installed as GLAO president during the group's recent annual meeting in Phoenix, Ariz.



Dr. Paul C. Levin

A past-president of the Ontario Association of Orthodontists as well as the Halton-Peel Dental Association and the Toronto alumni chapter of the Alpha Omega Dental Fraternity, Dr. Levin was awarded his DDS from the University of Toronto in 1972. He completed his postgraduate training in orthodontics at the University of Toronto in 1975. ■

Obituary

Dr. John E. Merritt

A former member of CDA's executive council has died.

Dr. John E. Merritt passed away January 21 in Halifax, N.S., where he practised for many years. He was 78.

After being awarded his DDS from the University of Toronto in 1942, Dr. Merritt enlisted in the Royal Canadian Dental Corps and served in Europe during the Second World War.

On his return to Canada in 1946, Dr. Merritt established a private dental practice in Halifax. He was a past-president of the Nova Scotia Dental Society, and was instrumental in bringing about government-funded dental care for children under 18 years of age.

Dr. Merritt was also appointed as the Queen's honorary dental surgeon, and served as the commander of 50th Dental Unit Eastern Command. ■

Errata

In the January 1998 issue of the *Journal*, in the article "Lateral Periodontal Cyst: A Case Report and Review of the Literature" by Drs. John P. Suljak, Richard N. Bohay, and George P. Wysocki (64:48-51, 1998), **Figs. 1a** and **1b** were cropped incorrectly. As a result, the lesion referred to in the photo captions was not shown. We are therefore reprinting the photographs, correctly cropped, in this issue **on page 221**. The *Journal* regrets the error.

In the February 1998 issue of the *Journal*, in the News Update section, the photographs of Drs. Ray Greenfeld ("CAE Appoints New Officers," p. 85) and Stanley Kogon ("UWO Appoints New Dental School Director," p. 92) were transposed. To avoid confusion, we have reprinted both photographs in their correct location in this issue. The *Journal* regrets the error. ■

CAE Appoints New Officers

The Canadian Academy of Endodontics (CAE) has appointed its slate of officers for the 1997-98 term.



Dr. Raymond Greenfield

Dr. Raymond Greenfield of Richmond, B.C., was appointed president of the academy. A 1968 graduate of the University of Manitoba's dental faculty, he received his diploma in endodontics from the University of Oregon in 1980 and was recognized as a certified specialist in endodontics by the College of Dental Surgeons of British Columbia. In 1985, Dr. Greenfield became a diplomate of the American Board of Endodontics and a fellow of the Royal College of Dentists of Canada. He currently maintains an endodontic

practice in Richmond, and is a guest lecturer at the University of Southern California and the University of Oregon.

Dr. Greenfield will be joined on the CAE executive by Dr. Richard Hunter of Toronto, Ont. (president-elect); Dr. Tom Mather of Edmonton, Alta. (treasurer); Dr. Carl Hawrish of Edmonton, Alta. (executive secretary); Dr. Marc-André Morand of Québec, Qué. (constitution and bylaws); and Dr. Calvin Pike of Kitchener, Ont. (past-president). ■

UWO Appoints New Dental School Director

The University of Western Ontario has appointed a new acting director to head its dental school.

Dr. Stanley L. Kogon was appointed acting director Jan. 1, and will hold the position until June 30, 1999. He has served as chair of the department of oral medicine, as well as chair of the divisions of peri-

odontics, and oral medicine and radiology, for 20 years.

Since 1995, Dr. Kogon has also served as assistant dean of clinical affairs. He was recently named assistant director of clinical affairs.



Dr. Stanley Kogon

Dr. Kogon's first order of business will be to smooth the integration of the UWO dental school into the university's recently created faculty of medicine and dentistry, and explore opportunities for program enhancement. ■

... Continued on page 221



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SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1997-1998 quiz will appear in the June 1998 issue of the *Journal*. Answers to the quiz will be published in the September 1998 issue. Dentists who complete the quiz may be eligible to receive continuing education points. The names and license numbers of all dentists who complete the quiz will be forwarded to their respective provincial licensing bodies for consideration. Quiz results will not be provided to individual dentists, and will only be forwarded to those provincial licensing bodies which specifically require them to assess the eligibility of participating dentists to receive continuing education points.

Questions 26 through 30 are a repeat of the questions that appeared in the February issue of the *Journal* accompanied with correct answers, the rationales and specific references. Questions 31 through 35 are new questions. The correct answers, rationales and specific references will be provided in the April 1998 issue. Keep all copies of the *Journal* so you can correctly respond to the June 1998 quiz.

QUESTION 26

The difference between cracked tooth syndrome and a vertical root fracture is that the latter is limited to the root with the fracture line running buccolingually.

In vertical root fractures the fracture line may not be visualized radiographically.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: C

RATIONALE:

Vertical root fractures may be either complete or incomplete. It can be difficult to establish a diagnosis of a vertical root fracture if no clinical mobility of fractured segments is detectable. Signs and symptoms produced by vertical root fractures can mimic conditions of pulp necrosis or failed root canal therapy. Often the clinical diagnosis can only be confirmed by direct visual inspection of the root through surgical exploration.

Signs and symptoms are related to the location and extent of the fracture line. It may extend through the whole root or only part of it. Most frequently encountered are deep isolated pockets, dull pain, swelling, pain on biting and the presence of a fistula.

Radiographically it may not be possible to see the fracture line, but at times a radiolucent fracture line is seen with separation of root fragments. Vertical fractures that

involve the apical portion of the root can produce a thin halo-like radiolucent band adjacent to the apical root surface, frequently extending to the mid-root levels. Fractures extending through retrograde fillings may cause them to be displaced from the apex. If the fracture occurred during root canal filling, radiopaque filling material may extrude into the fracture or into the periodontal ligament space.

A recent review by Walton² gives emphasis to the need to distinguish between cracked tooth syndrome (CTS) and vertical root fracture, the main distinction being that vertical root fractures are limited to the root with the fracture lines running buccolingually.

In addition, the cracked teeth must be distinguished from other types of tooth fractures such as craze lines, fractured cusps and split teeth.

REFERENCES:

- 1) Schettritt, A. and Steffensen, B. Diagnosis and Management of Vertical Root Fractures. *J Can Dent Assoc* 61: 607-613, 1995.
- 2) Walton, R.E. and Torabinejad, M. *Principles and practice of endodontics*, 2nd Ed. Philadelphia: Saunders, pp. 474-492, 1996.

QUESTION 27

Studies, using a dental pain model, have shown that ibuprofen 400 mg, when given orally, is superior to

1. acetaminophen 1000 mg;
2. acetaminophen 600 mg with codeine 30 mg;

3. ASA 650 mg with codeine 60 mg;
4. ketorolac (Toradol) 10 mg.

- A. (1) only
- B. (1) and (2)
- C. (1) (2) (3)
- D. All of the above.

ANSWER: C

RATIONALE:

Several studies using a dental pain model have shown that ibuprofen 400 mg was superior to

1. acetaminophen 1000 mg;
2. ASA 650 mg plus codeine 60 mg;
3. acetaminophen 600 mg plus codeine 30 mg;

Ketorolac (Toradol) 10 mg was superior to ibuprofen 400 mg.

Centrally acting analgesics, of which codeine is still the most popular, cause a plethora of limiting side effects. The acute side effects of the opioid (narcotic) analgesics are: nausea, sedation, dizziness, postural hypotension, respiratory depression (at high doses), urinary retention, constipation and general impairment of normal daily function. The chronic side effects are psychological and physical dependence as well as the need to increase dosage with time. The narcotic analgesics most frequently used for dental pain are codeine, oxycodone and hydrocodone.

Because of the side effects of the narcotic analgesics, the use of non-steroidal, anti-inflammatory drugs (NSAIDs) as analgesic agents for dental pain should be considered.

REFERENCES:

- 1) Cooper, Stephen A. The relative efficacy of ibuprofen in dental pain. *Compend Contin Educ Dent* II: 580-581, 584-588, 1986
- 2) Forbes, J.A., Kehm, C.J., Grodin, C.D. et al. Evaluation of Ketorolac, Ibuprofen, Acetaminophen and an Acetaminophen-Codeine Combination in Post-Operative Oral Surgery Pain. *Pharmacotherapy* 10(6) Pt.2:945-955, 1990.

QUESTION 28

The use of a composite resin for retrograde root fillings demands that

- A. the resin be condensed into an undercut at the root end;
- B. the resin be coated on the root end dentin;
- C. the root end dentin be treated with Gluma before applying the resin;
- D. the root end dentin be air-dried only before the resin is applied.

ANSWER: C

RATIONALE:

A recent study^{1,2} of 388 retrograde root fillings with amalgam and composite resin (Retroplast) showed that healing

postoperatively was much more favorable when composite resin was used to obliterate the root end. The Retroplast composite was bonded to the root end with Gluma to a slightly concave non-retentive surface. Gluma is a water based solution of 5.0 per cent glutaraldehyde and 35 per cent 2-hydroxyethylmethacrylate (HEMA). It acts on the dentinal collagen and allows the methacrylate groups to bond. When applied to the root end, care must be taken to coat only the root end dentin, before applying the thin layer of Retroplast. A dry field is necessary. For amalgam, an undercut cavity is required for retention.

Retroplast seals the main root canal and accessory canals as well as the dentinal tubules. Healing results after one year were significantly better with Retroplast as compared to amalgam. Both materials are cytotoxic but the mercury content of amalgam makes it less acceptable from a toxicological point of view. Histological studies of the two materials show that it is more difficult to secure a hermetic bacterial seal with amalgam.

A radiographic follow-up study³ by the same authors has demonstrated a 99 per cent success rate in the healing of the surgical areas after eight to nine years when treated with a dentin-bonded composite resin.

REFERENCES:

- 1) Rud, J., Munksgaard, E.C., Andreasen, J.O. et al. Retrograde root filling with composite and dentin-bonding agent, 1. *Endod Dent Traumatol* 7:118-125, 1991.
- 2) Rud, J., Munksgaard, E.C., Andreasen, J.O. et al. Retrograde root filling with composite and a dentin-bonding agent, 2. *Endod Dent Traumatol* 7:126-131, 1991.
- 3) Rud, J., Rud, V. and Munksgaard, E.C. Long-term evaluation of retrograde root filling with dentin-bonded resin composite. *J Endod* 22:90-93, 1996.

QUESTION 29

Metronidazole should not be prescribed for patients who are pregnant.

Patients taking metronidazole should not drink alcohol.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: C

RATIONALE:

Patients on metronidazole should not ingest alcohol because of a possible disulfiram-like reaction. Disulfiram (antabuse — used sometimes in the management of alcoholism) causes violent retching and vomiting in combination with alcohol. It is possible for metronidazole to cause a similar reaction. Because metronidazole is mutagenic in vitro, it should not be prescribed for patients who are pregnant.

REFERENCES:

- 1) Compendium of pharmaceuticals and specialties. 31st ed. 1996.
- 2) Sandor, K.B. and Uffen, K.F. Oral contraceptive failure. *J Can Dent Assoc* 53:775-777, 1987.

QUESTION 30

The integrity of fissure sealants is critical to success in prevention of caries and directly dependent upon acid conditioning of the enamel surface.

The highest bond strengths of fissure sealants are achieved using a 37 per cent solution of phosphoric acid applied for 15 seconds to the enamel.

- A. The first statement is true, the second statement is false.
- B. The second statement is true, the first statement is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: C

RATIONALE:

Sealants are organic polymers which mechanically bond to acid etched enamel. An impervious barrier is formed between the fissures and the oral environment preventing impaction of food debris and ingress of bacteria. Sealants should be limited to unrestored pits and fissures and applied as soon as possible after the eruption of EACH tooth. Patients receiving sealants should be on a preventive fluoride program to reduce the risk of smooth surface caries. Although excellent when used in preventive programs, there are no studies to the author's knowledge to suggest that sealants are cost effective. Since the sealant has been acid etched to the tooth surface, the peripheral resin has an adequate seal which prevents percolation. Trapped organisms, therefore, have reduced viability and caries progression is prevented.

The integrity of the sealant is critical to success in prevention of caries and directly dependent upon acid conditioning of the enamel surface. Results of a recent study¹ indicated that the highest bonding strengths were achieved using a 37 per cent solution of phosphoric acid applied for 15 seconds.

REFERENCES:

- 1) Brown, J.R. and Barkmeier W.W. A comparison of six enamel treatment procedures for sealant bonding. *Pediatr Dent* 18:29-31, 1996.
- 2) Waggoner, W.F. Managing occlusal surfaces of young permanent molars. *JADA* 122:72, 1991.
- 3) American Society of Dentistry for Children and the American Academy of Pedodontics. Rationale and guidelines for pit and fissure sealants. *J Pediatr Dent* 5:89-90, 1983.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 31

The taking of posterior bitewing radiographs is justified for all new dentate patients with posterior teeth over the age of

- A. two years;
- B. three years;
- C. four years;
- D. five years.

QUESTION 32

Success of Class II composite resin restorations is dependent on

1. the depth of the gingival floor;
2. control of moisture;
3. the degree of cuspal contact on the resin restoration from the opposing tooth;
4. the centric holding area.

- A. (1) and (2)
- B. (2) only
- C. (1) (2) (3)
- D. All of the above.

QUESTION 33

When using natural teeth as abutments for an overdenture, which of the following are correct?

1. Microexposures of the pulp can occur if dentin is exposed in vital abutment teeth.
2. Decoronated non-vital teeth are prone to caries on the occlusal and root surfaces.
3. Both non-vital teeth and vital teeth can provide proprioceptive impulses.
4. Decoronated non-vital teeth are more prone to caries on the root surface.
5. Only vital teeth will provide proprioceptive impulses.

- A. (1) (2) (3)
- B. (1) and (3)
- C. (2) and (4)
- D. (1) (2) (5)

QUESTION 34

In the case of a malpractice suit, which of the following are important in your defense?

1. A record of the patient's chief complaint.
2. A record of your examination findings.

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3. Ensuring that your dental assistant discusses the risks and benefits of treatment with the patient.
 4. Informing the patient about alternative treatment options.
- A. (1) and (4)
B. (1) (2) (4)
C. (1) (3) (4)
D. All of the above.

QUESTION 35

Advantages of the Endopore implant for treatment of the edentulous mandible are

- A. simplicity of use;
B. short implant length;
C. no dependency on bicortical stabilization;
D. resistance to torsional forces;
E. all of the above.

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Colgate, the Fowler-Pearce Partnership (Scotia-McLeod), Nobel Biocare, and SciCan.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education points required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education points.

Funding for the SLSA program has been provided by:





Giving Time To Your Profession Can Make a Difference

Burton Conrod, DDS

On a recent Sunday evening, homeward bound from a three-day CDA executive council meeting in Winnipeg, I started thinking about everything I had missed out on at home.

Because I had been away from home for two consecutive weekends to attend meetings, I didn't see my son win his first downhill race at the local ski club, I missed the annual meeting at my gun club, and it seemed like a long time since I had relaxed with my family.

Then I thought of all the dentists I had spoken with in my travels across the country during the last month, and realized that they were all doing exactly what I am trying to do – make time for their profession. From the British Columbia dentists advising tribal councils on the implications of the funding changes Medical Services Branch has planned for the Non-Insured Health Benefits Program, to the Newfoundland dentists trying to get the provincial children's dental plan on CDAnet, we are making a difference.

CDA, the provincial dental associations, and our licensing authorities draw on a rich resource of volunteers who willingly give up their time to represent our profession. In the arena of dental benefits issues, where benefits consul-

itants, plan providers, plan administrators and patients sometimes have competing and conflicting agendas, objectives and bottom-lines, these volunteer dentists are our front-line ambassadors. In this role, they champion dentistry's message that the dentist-patient relationship must be preserved, and that dentists must not abdicate this relationship to third parties.

There have been many exciting developments in dentistry's battle against the introduction and expansion of restrictive managed dental care programs in Canada. These developments were made possible by the efforts of dentist volunteers, supported by association staff.

The fight against managed dental care is being fought at the national, provincial and local levels. Examples of proposed new regional programming include an information package on managed dental care issues, which is being developed for new registrants to the College of Dental Surgeons of British Columbia, and the Ontario Dental Association's Horizon Plan.

A three-part program, the Horizon Plan will include a newsletter targeted at the insurance industry, a resource package for local dental societies, and round table discussion groups on dental benefits issues, which will be held at local societies.

British Columbia recently issued a discussion paper on private health savings plans, accompanied by a work sheet, to help dentists discuss these plans with their self-employed, incorporated patients.

On the other side of the country, the Ontario Dental Association's highly successful Plan Analysis Program provides advice to employer groups seeking information on their existing dental benefit plans. A grid system that emphasizes preventive dental care, and the enhancement of the dentist-patient relationship, is used to evaluate the plans.

The Alberta Dental Association (ADA) has just released a new practice management publication that includes a section on how a practice can effectively move away from assignment. In a recent media release, ADA announced that dentists will be phasing in a plan to "improve patient-dentist dialogue and relationships," as well as "involve patients more directly in treatment planning and payment methods."

Dentists in Atlantic Canada are preparing to launch ADSC Services Limited. This not-for-profit company was established to market prepaid dental benefit products, modeled on the cost-plus principle that has worked so well in Alberta, to small- and medium-sized employers. Its goal is to in-

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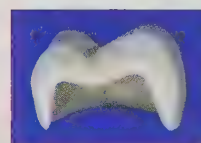


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crease the current level of dental benefit coverage, and thereby improve access to dental care for people who do not currently have a dental plan.

In Quebec, the Quebec Dental Surgeons' Association (QDSA) is continuing its aggressive campaign to halt the growth of managed care dental plans in universities. QDSA recently published a special newsletter, titled the *QSHA: a Trojan Horse*, to inform dentists about the pitfalls of participating in the Quebec Student Health

Alliance's (QSHA) preferred provider organization. This plan discounts dentists' fees heavily, and limits the patients' freedom to choose their provider.

CDA's committee on dental benefits issues is reviewing the regional programs being offered by our corporate members. Ultimately, we hope to partner with them to offer some or all of these programs nationally. CDA will also continue to produce fact sheets, magazine ads, and table talkers, in addition to publishing articles in our publications, to help dentists come to grips with dental benefits issues.

This year, the focus of CDA's external dental benefits activities will be on large employer groups and unions. We want to demonstrate to both employers and unions that CDA and the provincial dental associations are knowledgeable about dental plans, and can act as valuable resources when employers are considering changing their dental plan or implementing new cost-containment features.

We are currently developing information materials to communicate the profession's positions on managed dental care and other dental benefits issues to employers, and to provide comparative reviews of the various dental plans available on the market today.

In addition, dental health promotion designed to meet the specific needs of Canada's Native population is under development, and will appear in various publications serving this community.

The broad reach of CDA communications's materials is reflected in the results of a recent survey, in which 37 per cent of the Canadians polled recalled seeing, hearing, or reading at least one advertisement or message from CDA in the last six months.

Every level of dentistry is involved in the fight against managed dental care, right down to the members of CDA's student affairs committee. In each dental faculty, members of the committee are keeping an eye on managed care promotions within the student population, and suggesting changes to CDA's Student Practice Development Seminar program to educate tomorrow's dentists on interacting with their patients regarding dental benefits.

Over the last year, many dentists have confirmed my belief that the dental benefits industry is changing its attitude toward organized dentistry. The industry is listening, and they want the dialogue to continue.

With the consistent, integrated communications approach that organized dentistry has adopted, it looks like we are having a positive impact on our audiences. Although we have a long road yet to travel, one large national insurer went so far as to agree that increases in dental plan costs are related to increased utilization, not increases in fees or abuse.

CDA members across the country are making time for their profession. Their hard work is making a difference, and our patients as well as our profession will benefit.

Dr. Burton Conrod is in private practice in Sydney, Nova Scotia. He is chair of CDA's committee on dental benefits issues.

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GERIATRIC DENTISTRY



Dementia's Impact on Pain Sensation: A Serious Clinical Dilemma For Dental Geriatric Care Givers

G.L. Lapeer, DDS

ABSTRACT

Dementia's impact on pain sensation is not well understood. Very little research has been done in this area, our clinical knowledge is poor, and there is no published information available to practitioners. This article reviews the current literature and discusses the need for further research. The number of patients with dementia is growing. This patient group will require dental diagnosis and treatment, and cannot be ignored by dentists. A humane approach to treatment must be adopted.

Introduction

Elderly individuals have an increased propensity for developing painful pathologies and dementia. As people are living longer, there has been an exponential growth in the number of individuals affected by dementia in recent years.¹ Various studies have recorded a 1.0 per cent incidence of dementia in 60- to 65-year-old individuals. This incidence doubles approximately every five years to reach 25 to 50 per cent in 85 year olds.²⁻⁴ Geriatric care-givers will be increasingly challenged by patients with dementia who are simultaneously suffering from a painful condition.

The author works in a hospital-based dental practice with a large concentration of geriatric patients.

Diagnosing painful conditions in ageing dental patients suffering from dementia is an ongoing problem. The confused elderly patient who complains of pain until his consultation, but then repeatedly denies any discomfort, and the agitated patient with severe Alzheimer's type dementia and a severely decayed dentition, who constantly chews his or her fingers, are only two examples of the many situations dentists can face dealing with demented individuals.

Our limited clinical understanding of dementia's impact on pain sensation creates additional difficulties. Very little research has been done in this area, and there is little published information. As a result, most clinicians try to ignore the problem. The purpose of this article is to review the existing literature, and discuss possible avenues for further research.

Defining Pain

Painful stimuli are relayed from the body's sensory receptors via the lateral and ventral spinothalamic tracts. As pain impulses ascend from the peripheral nerve to the spinal, medullary mesencephalic, thalamic and limbic levels, the predictability of the neuronal reaction to noxious stimuli diminishes.⁵ The result is a primitive sensation with considerable subjective variability.⁵

Pain is a highly individual experience that incorporates sensory/discriminative, cognitive/evaluative and affective/motivational components.⁶ It is shaped by contexts and beliefs, and will dictate some behaviors but be modified by others.¹ As defined by the International Association for the Study of Pain, pain is: "An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."⁷

Defining Geriatric Pain

Many clinicians assume that ageing is associated with a loss in the ability to perceive and accurately report pain.⁸ They also feel that ageing results in an increase in nonspecific pain-related suffering and pain complaints. However, these assumptions are derived from scant findings and inadequate research.⁹

The physical, psychological and physiological attributes of pain in the elderly have not been well documented. Conversely, other than pain, all of the major and most of the minor sensory modalities have been characterized for this population.

Harkins et al¹⁰ have presented four reasons why there has been such a lag in understanding nociception in the ageing population. First, it is uncertain whether the stimuli that activate a specific sensory modality

can be controlled and quantified precisely. In auditory psychophysics, the ability to quantify and control sound has facilitated the study of hearing changes in the ageing. But the "quantification and control of stimuli that produce pain have been far less precise, largely because many such stimuli, by their very nature, are potentially damaging and difficult to present repeatedly with the same effect."¹⁰

Second, the different attitudes and beliefs that researchers have about pain has led to confusion and unanswered questions. For example, does pain operate more as a motivational system or as a true sensory modality?^{11,12} Some researchers believe that the pain system deals with crude discriminative information only.^{11,13} An extreme position is that pain is a private experience, and does not lend itself to experimental examination.

As a result of the ongoing confusion, and because it could not be studied in the same way as other sensory modalities, many researchers have been dissuaded from attempting to analyse pain.

Third, personal preferences have directed research away from pain to other sensory modalities. And fourth, there are many who assume that ageing results in a loss of pain perception.

The available literature on geriatric pain has been reviewed by Melding⁹ and Harkins et al.¹⁰ Although various studies^{14,15} have found that the age-specific morbidity rate for persistent pain increases with age, and that it occurs with a prevalence ranging from 75 to 80 per cent, other studies¹⁶ have demonstrated an age-related reduction in the prevalence of chronic pain at all sites other than joints. In fact, the sensation of pain may not decline with age, but the elderly may have less inclination to complain of pain.⁹

Large cross-section studies¹⁷ of pain sufferers have shown that pain intensity, depression and impairment in the activities of daily living (ADL) were consistently greater in the elderly than in younger patients. These results indicate that advanced age is associ-

ated with increased risk for musculoskeletal pain; greater pain intensity; depression; and limitations in ADL. However, Harkins et al stipulate that these causal relations cannot be derived from the cross-sectional data, and that "longitudinal research with appropriate causal modelling is necessary to address the relationship of pain, depression and limitation in ADL in the elderly."¹⁰

Defining Dementia

Dementia is a disease process. Its incidence increases exponentially with advanced age, but it is not an inevitable accompaniment of old age.¹⁸ Dementia can generally be classified into three types: senile dementia (Alzheimer's type), which accounts for 50 per cent of cases; vascular (multi-infarct type), which accounts for about 30 per cent of cases; and a group of dementias that could have any one of numerous causes.

Coni, Davison and Webster have outlined the clinical characteristics of dementia¹⁸: "The condition is progressive. In the early stages, insight is usually preserved and this may lead to profound depression and anxiety, but then some or all of the following features become apparent:

- loss of power of concentration and attention;
- grossly reduced capacity for new learning;
- loss of memory, initially recent but later long term;
- behavior may deteriorate and become disinhibited, noisy, antisocial, dirty, aggressive;
- confusion, disorientation, poor grasp of circumstances;
- restlessness, wandering, self neglect;
- incontinence and immobility;
- apathy, inability to converse, difficult to engage attention;
- plucking at clothing."

This diagnostic outline, plus others, such as those of the Royal College of Physicians¹⁹ and the American Psychiatric Association,²⁰ still do not overcome the confusion that exists in diagnosing

dementia. The clinical diagnosis of Alzheimer's disease largely depends on the behavioral impairments expressed by the patient. Unfortunately, these behavior manifestations are not uniform. Some clinical features are not evident in all patients, and those features that are consistently present vary considerably in expression. These heterogenous behaviors, and the fact that different features of the disease may be found in different patients even though there are similar degrees of disease duration or dementia severity, results in diagnostic uncertainty.

To establish a clear working definition for dementia, in 1991 the World Health Organization (WHO) drafted the following definition²¹: "A syndrome due to disease of the brain, usually of a chronic or progressive nature in which there is a disturbance of multiple higher cortical functions, including memory, thinking, orientation, comprehension, calculation, learning capacity, language and judgment. Consciousness is not clouded. Impairments of cognitive function are commonly accompanied, and occasionally preceded, by deterioration in emotional control, social behavior, or motivation. This syndrome occurs in Alzheimer's disease, in cerebrovascular disease, and in other conditions primarily or secondarily affecting the brain."

The Interaction Between Pain and Dementia

The interaction between pain and dementia was recently reviewed by Farrell et al.¹ Dementia anatomically affects the integrity of the nociceptive pathways, but the individual's experience of pain can vary. Although Alzheimer's disease is a disorder of the neocortex, it leaves the somatosensory cortex and thalamic nuclei relatively unaffected. The sensory/discriminative quality of pain perception is generally preserved, but sensory distortions associated with parietal dysfunction may occur. However, the emotional response to the pain experience in the Alzheimer's patient cannot be anticipated.

Natural loss in the limbic structures and prefrontal cortex has serious implications for any arousal, motivation and affective reaction to pain. "Indifference to pain, disinhibition and preservation of emotional responses are all possible in the context of a global yet variable cognitive disorder."¹

Vascular dementia results from infarct(s) in the central nervous system. These infarcts can occur in the structures that form the pain pathway, and could alternatively ameliorate or provoke the suffering associated with pain.¹ Infarcts involving the somatosensory cortex and its connections impair the individual's responses to painful stimuli,^{22,23} and lesions in the area can cause a decrease in ongoing clinical pain.²⁴ Price¹² showed that infarcts within the prefrontal cortex may also attenuate negative emotional and motivational responses to painful stimuli. The influence of vascular dementia can also be expected to vary considerably from subject to subject, but perhaps without the same patterns as those postulated for Alzheimer's disease.¹

Acute Geriatric Pain

Acute pain and referred pain have not been evaluated properly in the elderly. Although the acute pain from superficial structures will differ from the acute pain occurring in deeper structures, the acute pain associated with cutaneous structures,²⁵ most fractures, and muscle, joint and tendon strain, probably do not change in a clinically significant manner with age in otherwise healthy elderly people.¹⁰

Acute pain is an indicator of actual or possible tissue damage, and may therefore be important for the survival of the individual.¹⁰ If the pain signal changed with ageing, it would lead to confusion in diagnosis.¹⁰ In the elderly, however, alterations in acute pain presentation stem from either age-related developmental changes in the individual's physiology or anatomy, or from currently unrecognized disease processes.

The silent acute myocardial infarct (MI) is one of the most serious of these changes. Age is an independent risk factor for decreased ischemic cardiac pain.^{26,27} Therefore, acute pain occurring with a myocardial infarction may not be a primary presenting symptom in the elderly, even though it is a key diagnostic feature of myocardial infarctions in younger individuals.²⁷ Diminished pain sensations are not unique to the elderly population, however, as silent ischemia and atypical chest pain all occur with a significant frequency in younger individuals, but less than in the elderly.¹⁰ At any age, the absence of pain in an acute MI situation is associated with increased morbidity.²⁷

As stated by Harkins et al¹⁰: "There is no catalogue of acute, potentially catastrophic conditions usually characterized by pain which frequently present without pain in the elderly."

Acute Pain — Communicative Patient

For the purpose of this discussion, patients with dementia can be classified into two groups, communicative (mild to medium cognitive impairment) and non-communicative (severe cognitive impairment). A number of studies have described atypical presentations of acute pain in the elderly,²⁸⁻³⁰ but the associated morbidity of dementia was not taken into account. Therefore, it is not clear how demented patients contributed to the findings.¹

Blennow, Wallin and Hager³¹ studied 395 subjects with dementia who were undergoing lumbar puncture. The incidence of post lumbar puncture headache was 2.0 per cent. This varies significantly from the Knutz et al³² study, which showed a 40 per cent incidence of post lumbar puncture headache in 501 non-demented subjects. These studies indicate that dementia reduces the expression of acute pain, as well as the function of the volumetric changes associated with brain atrophy.¹ They may also reflect differences in pain pathology due to ageing.¹

The phenomenology of acute pain in ageing patients with dementia is still vague. Porter et al³³ studied the responses prior to, during and after venipuncture in older subjects with varying degrees of cognitive ability. Individuals were not classified as demented, but subjects with diminished cognitive skills had decreased heart rate responses on presentation of the syringe, and a proportionately greater decrease in heart rate during the procedure. They concluded that these subjects were less prepared for the pain, and that it came as a surprise when it occurred.¹

Acute Pain — Noncommunicative Patient

There are a number of anecdotal reports^{5,34} describing pain-related behavioral changes in patients with advanced dementia and impaired language skills. These descriptions are from staff observations and are very speculative, however. Marzinski³⁵ studied subjects from a large nursing home, and found that many of the behavior mannerisms associated with pain do not correlate with conventional notions. It therefore "cannot be presumed that responses elicited by noxious stimuli in a demented individual will necessarily reflect classic pain behaviors."¹

The development of an index for identifying acute pain in advanced dementia patients with dysphasia may be precluded by the diversity of their pain responses.¹ But, and this is very important, "the possibility that acute pain may contribute to a change in behavior should be considered in any such instance and a trial of a palliative intervention considered."¹

Geriatric Chronic Pain

Chronic pain is pain that persists for at least one month beyond the usual course of an acute disease or beyond a reasonable time for injury to heal.¹⁰ It can also be the pain associated with a chronic pathologic process causing continuous pain, or pain that recurs at intervals for months or years.²⁵ Unlike an attack of acute pain, the chronic pain of osteoarthritis, for

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example, provides no warning of impending or actual tissue damage, has no survival value, and is a malefic force that is deleterious to the patient, his or her family, and to society.²⁵

Harkins et al¹⁰ studied the age-related differences in pain intensity and unpleasantness among a group of patients in a chronic pain clinic. The patients were divided into two groups. There were 81 "younger" individuals in the first group, with an average age of 35.6 years, and 19 "older" individuals in the second group, with an average age of 71.3 years.

Using the Visual Analogue Scale (VAS), no significant age difference in pain intensity or unpleasantness was observed between the two groups. Although these data would seem to indicate that chronic pain intensity and unpleasantness are similar in different age groups, the patients in the older age group may not be representative of the general population of older individuals.¹⁰ The sample studied was a select group of older individuals who were accepted for evaluation and treatment at a multi-disciplinary pain clinic.

Similar results were obtained by Sorkin et al¹⁵ and Puder,³⁶ however. Sorkin¹⁵ concluded that age should not be a factor in offering physical and/or psychological treatments to older chronic pain patients in a multidisciplinary pain clinic, and Pruder³⁶ concluded that age is not a contraindication for standard chronic pain interventions.

It appears that the elderly respond to pain therapy as successfully as younger individuals. However, a number of individuals still believe that pain decreases with advancing age.^{37,38} As is true with acute pain, chronic pain in ageing patients is still a topic of disagreement among researchers.

Chronic Pain — Communicative Patient

There are two main arguments related to chronic pain complaints in communicative patients with dementia. Fordyce,³⁹ Hendler,⁴⁰ and Taylor et al⁴¹ argue that demented patients use pain to mask

deficiencies associated with their deteriorating cognitive function. Increased pain reporting by mild dementia patients is a manifestation of this condition. The second argument is that individuals with dementia are "less able to recall, interpret and articulate their pain experience, and consequently are less likely to report pain."¹

The research underlying these proposals is still very speculative, and the argument suggesting an increase in pain reporting by communicative patients with dementia has only been supported with case reports.^{40,41} Using cross-sectional studies, similar and lesser complaints of pain by individuals with and without cognitive impairment have been reported by Brody and Kleban.⁴² However, in an audit of 375 medical charts, McCormick et al⁴³ reported a decrease in recorded joint pain. Their study compared individuals suffering from Alzheimer's disease with those who were cognitively intact.

Parmelee et al⁴⁴ studied 758 ageing adults in a residential facility, and reported a decrease in pain reporting among demented individuals relative to cognitively intact individuals. The existing data therefore seem to support the assumption that individuals who suffer from dementia have a decreased frequency and intensity of pain reporting.

Several reasons to support this hypotheses have been presented by Farrell et al.¹

One, because patients suffering from dementia have dysphasia,¹⁰ queries about pain could be distorted by expressive and receptive language errors.

Two, dementia-related memory impairment has the greatest potential for distorting pain reporting by individuals with continuous pain, as the pain experienced at one moment could be almost immediately forgotten. Individuals without cognitive impairment abstract pain memories that reflect various levels of mood and pain. This distortion could be amplified in dementia. Also, pain states that have an intermittent course can further diminish pain reports by individu-

als, given that recent past experiences are inaccessible to those suffering from dementia. As a result, it could be perceived that pain is experienced less frequently by patients with dementia.

Three, patients with dementia report less pain because they experience less pain. As discussed previously, the pathogenesis of dementia can affect the modulation and transmission of pain. Another hypothesis states that the episodes of pain suffered by an individual with Alzheimer's disease may be modified by the relative level of co-morbidity.¹ This hypothesis is disputed by the analyses done in separate studies by McCormick et al⁴³ and Parmelee et al,⁴⁴ however, which both incorporated co-morbidity indices to measure the potential role of intercurrent illness. Therefore, co-morbidity does not seem to be a determining factor with regards to the relative frequency of pain complaints by individuals with dementia in the samples studied.¹

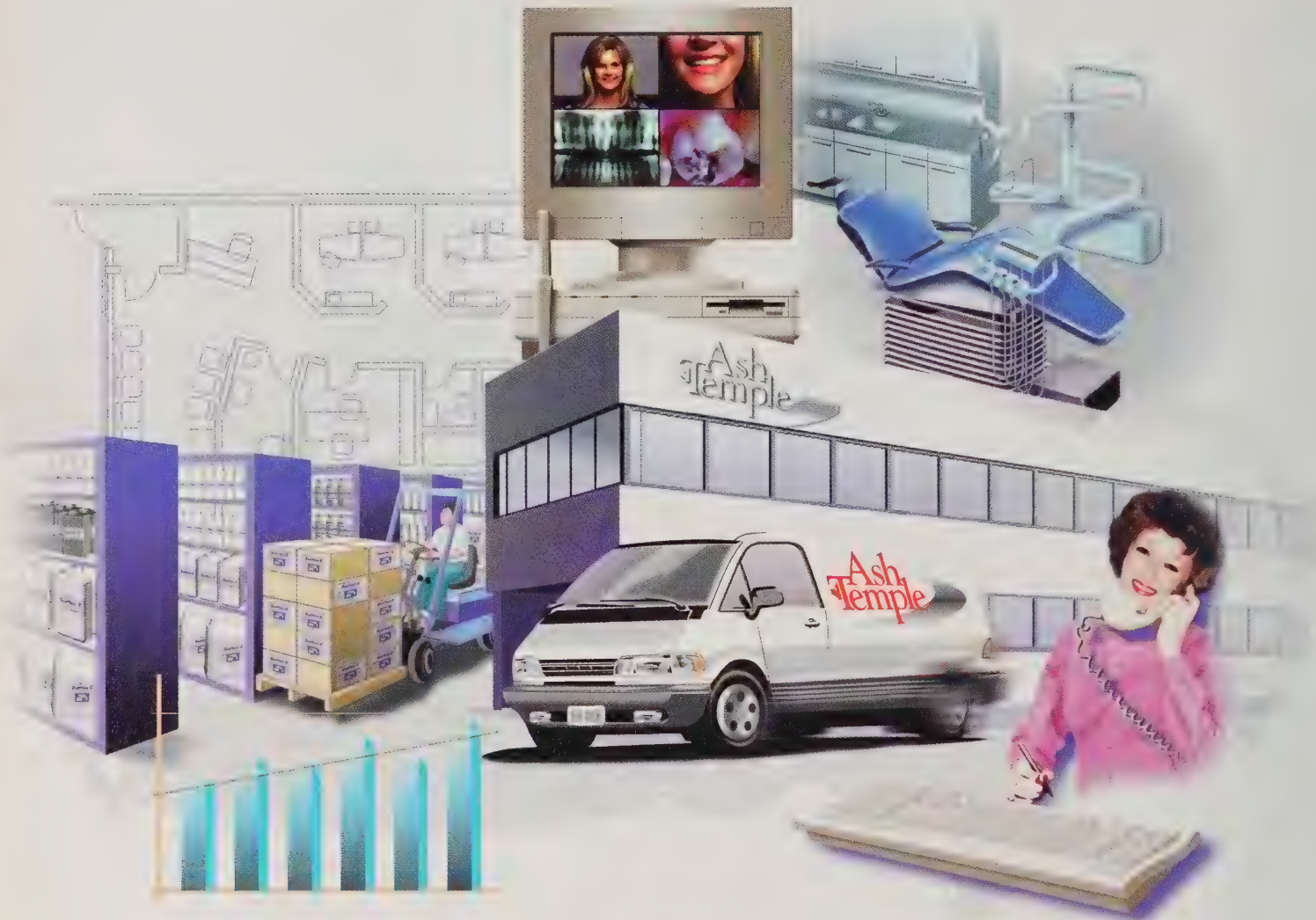
Four, rather than the general effect of co-morbidity, there may be a specific effect that operates among Alzheimer's patients. For example, osteoarthritis accounts for the greatest pain complaint in older individuals.^{10,16} Several researchers have presented evidence indicating that the use of non-steroidal anti-inflammatory drugs, a common treatment for osteoarthritis, results in a reduced risk of Alzheimer's disease.⁴⁵⁻⁴⁷ Although this evidence is promising, further research is required to uncover any specific effects of co-morbidity that result in a difference in pain complaints among those suffering from dementia.

And, five, chronic pain patients suffer from depression,⁴⁸ which is a common finding in patients with dementia. But at this time, the interrelationship of pain and depression has not been studied in relation to cognitive impairment.

Chronic Pain — Noncommunicative Patient

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dementia from receiving analgesics is probably their lack of language skills.⁴⁹ When individuals are cognitively intact, episodes of constant or intermittent pain can be identified by monitoring their behaviors, including prescribed postures and activities, and facial expressions. These constructs can then be tested against verbal reports.

In the absence of language skills, behavioral observations are critical to pain measurement. But for individuals with advanced dementia, behavioral observations must be taken at face value.¹ The determination of pain behavior is very difficult in these cases. As Farrell et al: "Just as pain may not be associated with recognizable behaviors, stressful events other than pain, such as hunger, constipation, and acute illness, may precipitate behavioral changes that are misinterpreted as pain."¹

Pain has been used as a predictor of aberrant behavior. Cohen-Mansfield et al^{50,51} reported a positive association between pain and greater frequencies of screaming, verbal agitation and aggression in a group of severely demented patients. The patients were rated by a number of nurses and social workers in a subjective manner. Again, this approach leaves itself open to criticism.

The interpretation of behavioral displays must be modified in dysphasic demented patients, because verbalization, aggression and other behavior could signal conditions other than pain.

Discussion

The elderly typically experience a lot of pain.⁹ They are prone to osteoporosis, osteoarthritis, rheumatoid arthritis, Paget's disease, and cervical spondylosis. Stroke can lead to severe dysesthetic intractable pain as infarction destroys sensory pathways. Intermittent claudication, sympathetic dystrophies and vasculitis are common, and could lead to amputation and phantom limb pain. Elderly people are also prone to fractured bones and prolonged healing, which can lead to pain and disability. Neuropathies resulting from alcohol

over-use, diabetes mellitus and malnutrition increase with age. Herpes zoster is also a disease that mainly affects the elderly.

Logically, medical clinics should be overloaded with elderly patients seeking help for pain problems. Why this is not happening remains unclear. This question needs to be resolved before we can solve the dementia-pain dilemma.

At present, there are few answers and many questions. There are only a few papers on geriatric pain and the pain experienced by individuals with dementia. According to Medline data, they account for about 1.0 per cent of the 4,000 papers published on pain in any given year.⁹ Is this because there really is no such thing as geriatric pain or pain in dementia? Are the subjects described in the existing literature representative of all age groups?

Second, we lack valid epidemiological data on the pain occurring in the elderly, and the studies that do exist draw different conclusions. For example, Crook et al,¹⁴ Sorkin et al,¹⁵ and Thomas and Roy⁵² showed that the age-specific morbidity rate for persistent pain increases with age. Conversely, Steinback¹⁶ reported that pain diminishes in older patients, except in their joints. Does pain decline with age, or do older people complain less?⁹ And if pain decreases with age, why does this happen?⁹

Third, the biological changes of ageing that affect the pain pathways have received little research attention, even though the central and autonomic nervous systems degenerate with age. Are the pathophysiology and perception of pain affected by imbalances in ageing neurotransmitter and neuroendocrine systems, a diminished response, or degeneration? Do they enhance pain, diminish it, or do both?⁹ Does pain decline with age like hearing and vision, and how does cognitive impairment influence pain?⁹

Four, what effect do the psychological and social functioning of the elderly have on pain?⁹ Pain may be used by the elderly to justify the loss of mobility and legitimize dependence.⁵³ For others,

chronic pain behavior may be a way to get love, contact and attention. Depressive symptoms are common among the elderly, and there is a link between depression, chronic pain and physical illness.⁵⁴ The elderly have a restricted range of coping strategies, and quickly become demoralized during illness. They are very prone to major life stressors. Bereavement is common due to loss of life partners, friends, jobs, homes, health, independence and self worth. Psychosocial and emotional "pain" is not insignificant in the aged, and neither is the incidence of painful physical disease. Do these two forms of pain equate, and form the basis of geriatric pain?⁹

And fifth, why are so few elderly patients being seen in pain clinics?⁹ Is it because of an old age stoicism or negative referral bias, or both of these things?⁹ Psychiatrists often stereotype elderly patients when they present treatment choices.⁵⁵ Are negative attitudes affecting the study of pain and the treatment of pain in the aged?⁹

The protocols for treating pain in patients with dementia are still confusing. Clarifying this perplexing problem will require investigation along a number of research avenues.¹ First, since no animal model is available, the problem of how to conduct ethical research in an appropriate manner has to be overcome. Second, the extent to which dementia alters the transmission and integration of painful information must be explored. Third, controlled studies are required on the identification, description and management of acute and chronic pain in individuals with dementia. Fourth, methods must be developed to test the hypothesis that the sensory/discriminative abilities of individuals are preserved in cases of Alzheimer's type dementia. Fifth, the existing instruments for pain measurements should be validated. Sixth, the contributions that dysphasia, memory impairment and co-morbidity make to pain reporting by demented individuals must be scrutinized. Seventh, "The interaction between cognitive impairment and the experience of

pain warrants attention both because of its implications for the plight of people with dementia, and for the insights it may provide into the role of cognitive factors in shaping pain in people without dementia.⁷¹ And, eighth, reasonable attempts should be made to investigate whether or not context, prior associations, and the meanings ascribed to the experience of pain can be modified by dementia.

Apart from these directions in research, clinicians should develop their pain assessment skills so that demented patients are diagnosed properly. Pain assessment involves the identification of pain behavior, both verbal and nonverbal. The compliant patient, who is both communicative and cognitively alert, will provide body language and verbal responses that enable the clinician to assess his or her painful condition. But if verbal and nonverbal cues are poorly communicated, the clinician becomes confused and the pain may be poorly assessed and under treated.

Many health care professionals lack the skills to properly assess pain.⁵⁶⁻⁵⁸ They also tend to consistently underestimate pain,⁵⁹ resulting in the frequent poor management of pain.⁶⁰ There is a tendency to withdraw from the patient and be less aggressive in finding a solution for the pain problem when attempts to alleviate pain fail. Patients also become stereotyped when no visible pathology is present.⁶¹ Studies have shown that nurses have a tendency not to administer analgesics with psychological effects to individuals with painful conditions that are psychological in nature.^{61,62} Also, despite the magnitude of pain, 60 per cent of hospital patients and 83 per cent of home care patients are medicated less than necessary.⁶² Finally, because attitudes about pain and suffering appear to be socially learned responses, health care professionals may recognize pain, but incorrectly estimate its severity and duration due to cultural differences.⁶³

Although a number of research avenues must be explored to illuminate the complex problem of

pain in the cognitively impaired dysphasic patient with dementia, a hard cruel fact remains: these patients are here now and their numbers are growing rapidly. Health care givers dealing with the ageing population must make it a priority to establish a working protocol for pain diagnosis. At present, most pain assessment instruments rely on verbal reports. Pain assessment with non-verbal behaviors, which include gait, facial expression and posture changes, have been developed in younger populations. These assessment techniques would serve no function in the non-communicative cognitively impaired patient with dementia, however.

A possible path for diagnosing pain would be to develop an index of likelihood of pain.¹ This index would be derived by establishing criteria for recognizing discomfort, feedback from care givers regarding pain, and the identification of pathologies that create pain.⁶⁴ If the index proves functional for a communicative, moderately demented population group, then it would be very useful to use it to assess the pain of severely demented individuals. Changes in patients' behavior could be correlated with analgesic use.

Conclusion

The research on geriatric pain and the pain experienced by demented patients is still confusing and sparse. Despite the lack of guidance for health care providers, we must not ignore the possible suffering of a non-communicative demented patient who is unable to express him or herself in conventional ways. An existing problem may be expressed in some behavioral manifestation or extrapolated from the clinical picture that appears. Dental professionals and other health care providers must err on the side of treatment rather than ignore a potentially painful condition, while researchers must explore the complexity of geriatric pain and the pain experienced by demented individuals, and develop protocols for diagnosis and treatment. ■

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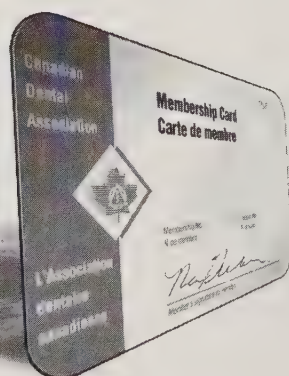
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Please note that the prescribing information for Septodont-Septanest was accidentally omitted from the February 1998 issue of the *Journal*.



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Septanest (articaine hydrochloride) is a local anesthetic that has the reversible effect of blocking the conduction of painful sensations. **Septanest** decreases nerve conduction by diminishing the sodium ion influx during the action potential period.

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Septanest (articaine hydrochloride) is contraindicated in patients with known allergies to dental anesthetics. **Septanest** is also contraindicated in patients with sepsis near the proposed injection site, severe shock, paroxysmal tachycardia, frequent arrhythmia, neurological disease, severe hypertension or in patients with asthma who may have bronchospastic allergic reactions induced by sulphites.

Since **Septanest** contains epinephrine the caution required of any vasoconstrictor drug is in order.

Warnings

Septanest, along with other local anesthetics, is capable of producing methemoglobinemia. The clinical signs of methemoglobinemia are cyanosis of the nail beds and lips, fatigue and weakness. If methemoglobinemia does not respond to administration of oxygen, administration of methylene blue intravenously 1 to 2 mg/kg body weight over a 5 minute period is recommended.

Precautions

Each time a local anesthetic is used, anti-convulsant medicines (benzodiazepines or barbiturates which can be injected), myorelaxants, atropine and vasopressors, resuscitating equipment (in particular a source of oxygen) enabling artificial ventilation, should be available. The safety and effectiveness of local anesthetics depend upon proper dosage, correct technique, adequate precautions, and readiness for emergencies in persons with known or suspected drug allergies or sensitivities to amide-type local anesthetics. **Septanest** should be given cautiously.

Patients with Special Diseases and Conditions

In patients with peripheral vascular disease or injection into areas with limited blood supply, the use of a local anesthetic containing a vasoconstrictor should be made with caution. Due to the presence of epinephrine, **Septanest** is not advised for diabetic subjects.

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Adverse Reactions

Reactions to **Septanest** (articaine hydrochloride) are characteristic of amide-type local anesthetics.

Adverse reactions of this group of drugs are generally dose-related and may result from high plasma concentrations of anesthetic caused by inadvertent intravascular administration, overdosage, or rapid absorption from the injection site as well as reduced patient tolerance, idiosyncrasy, or hypersensitivity.

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Septanest N (articaine 4% with 1:200,000 epinephrine)
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As with all local anesthetics the dosage varies and depends upon the area to be anesthetized, the vascularity of the tissue, the number of numeral segments to be blocked, individual tolerance and the technique of anesthesia.

Do not exceed the equivalent of 7 mg/kg articaine hydrochloride body weight which corresponds, for a subject weighing 60 kg, to 6 standard 1.7 ml cartridges. The lowest dosage needed to provide effective anesthesia should be administered.

Septanest N and Septanest SP

Procedure	Volume (ml)	Total Dose (mg)
Infiltration	0.5-2.5	20-100
Nerve Block	0.5-3.4	20-136
Oral Surgery	1.0-5.1	40-204

Children

For **Septanest N** and **Septanest SP** use in children under 4 years of age is not recommended. The quantity to be injected should be determined by the age of the child and the size of the operation. Do not exceed the equivalent of 7 mg articaine hydrochloride per kilogram of body weight.

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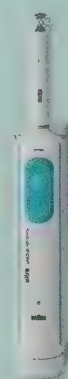
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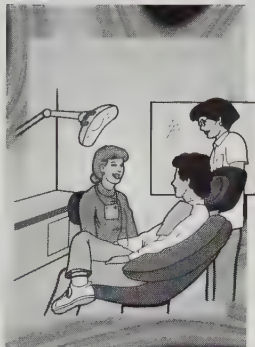
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FEATURE



The Forgotten Discipline Of Dentistry

James P. Morreale, DDS

The Ontario University Coalition for Education In Health Care of the Elderly defines "geriatric dentistry" as a branch of dentistry that focuses on the diagnoses, prevention and treatment of oral diseases in adults who, because of their medical condition or old age, are handicapped or institutionalized and require special management during their dental treatment.

Everywhere you look in dental journals, you see articles on implants, cosmetic dentistry and esthetic dentistry. But no one seems to be interested in looking after the patients in long-term care homes. We have restored, crowned, and root canal filled their teeth, which are now being left unattended and susceptible to decay.

It has been shown demographically that the Canadian population is aging. By 2036 the elderly population in Canada will account for 23 per cent of the total population, compared to 11.6 per cent in 1991.

Despite this, organized dentistry in Canada has not lobbied government to legislate some direction or standards of care for the patients in long-term care facilities. The reverse seems to be true in the United States and Europe, however, where geriatric care has

gained specialty status and is being taught by the dental schools. Government is even offering fellowships to help support these courses.

The need for a greater emphasis on geriatric care in Canada is clear, as can be seen in the following three case reports.

The first patient (Figs. 1 and 2) was bedridden at home in the late stages of Parkinson's disease. I was asked to examine the patient because she had one tooth left in her mouth, which was sharp and causing some problems. On examination, I determined that she also had a number of root tips. The care-giver and the doctor saw the fractured right central incisor, but could not see the root tips of the left lateral, cuspid, first bicuspid, and first molar that were buried in the gingiva.

The patient was a mouth breather, which caused the oral tissues to be inflamed. In this case, we smoothed the sharp piece of the right central and provided palliative care. The patient was treated with 0.12 per cent chlorhexidine swabs in the area of her right central incisor, KY jelly for her lips, and lots of fluids. She was also prescribed an antibiotic. We will keep this patient under observation.

The second patient (Figs. 3 and 4) was also homebound, and was in palliative care with cancer of the prostate that had metastasized. We were asked to examine the patient because "he has pain in his lip and in his tooth." This patient had most of his teeth. However, because of his pain and the drugs he was taking (a hydromorphone drip Dilaudid), he was in the habit of biting his lower lip with the upper second bicuspid. This had caused a laceration. We extracted the upper bicuspid and the laceration healed. No further treatment was administered at this time, as his condition was critical. We are maintaining him on a fluoride rinse at night and a 0.12 per cent chlorhexidine rinse twice a day.

The third patient (Figs. 5 and 6) was examined at our clinic at St. Peter's Hospital, a geriatric chronic care hospital in Hamilton, Ont. The patient was in her 80s. She had undergone a full mouth reconstruction many years ago, but the devastation of her bridgework was considerable. A whole abutment crown was empty where a tooth was supposed to be. This crown was anchoring a seven-unit bridge, which had a precision attachment holding a partial denture. The

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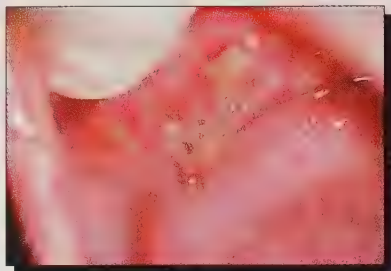


Fig. 1: The patient is suffering from the end stages of Parkinson's disease and keeps her mouth open constantly, allowing a debris to form in the palate.



Fig. 4: The tooth in the upper arch makes an imprint into the lip.



Fig. 2: There is one tooth and several decayed root tips in the patient's maxilla. The roots are buried in the gingiva.



Fig. 5: A self-curing flowable composite is placed into the hollow abutment tooth of a large span bridge.



Fig. 3: The patient is suffering from prostate cancer. Because of his medication (Dilaudid drip), he constantly bites his lower lip with the bicuspid tooth in the maxillary arch.



Fig. 6: The lingual view of the fixed bridge that supports a precision attachment partial denture. Some of the remaining abutments for this prosthesis are also suffering from deep root caries.

remaining abutments had root caries and needed repair.

We removed the decayed material in the crown and filled the crown with a flowable self-curing composite. The root tip remained in the bone. We showed the patient how to clean under the crown, but left it in place because she was too ill to undergo further surgery. The patient had a serious blood dyscrasia, which required her to receive periodic transfusions of blood to maintain her hemoglobin. We will keep her under observation.

The health of these patients' mouths was not exceptional. When people get sick, they neglect their teeth. This is only natural. However, it should be equally natural for family members, caregivers, nurses, and doctors to look in the mouths of geriatric patients to assess their unhealthy situation and seek appropriate treatment.

As dentists, we have a responsibility to educate other health-care professionals and the general public about the oral health of geriatric patients, as well as how

to assess and take care of the persistent infections that occur in the mouths of these individuals. We also have a responsibility to educate the allied medical professions about dental neglect, and its impact on the general health of their geriatric patients.

The Metropolitan Toronto Public Health Office puts out reams of statistics each year, but no one seems to be paying much attention. There is a tremendous need for organized dentistry and government to address the problems that exist in treating the Alzheimer patient, the elderly patient who has some form of dementia, the stroke patient who experiences some disabilities, and the cancer patient in palliative care.

We have healthy 70-year-old patients who have had all or most of their teeth restored or enhanced with fixed bridges, veneers, crowns, cosmetic restorative procedures, endodontic procedures, periodontal procedures (gingival grafts etc.), prosthetic appliances, and even orthodontics.

These patients have spent time and money to maintain and improve their oral health. But if they have a stroke, or other disabling disease, their access to quality dental care will likely be severely curtailed. They will probably be placed in a nursing home, where no one has the time or motivation to help them care for their teeth, or even to assess their oral health at admission. They eat each day, but no one is available to encourage them to follow good oral hygiene, or to take a brush to their teeth and gingiva.

We dentists, who have been well paid to restore and maintain the teeth of these patients in the past, forget or lose track of them once they are no longer able to visit our offices. Yet unless we meet our responsibility to educate the care-givers, family, and other health care professionals about the daily preventive dental care needs of these patients, their teeth will eventually rot in their mouths. By the time we get to see them, we will have a dilemma on our



hands. It is difficult to provide restorative or corrective treatment, because these patients are very old, are often taking many medications for different ailments, and may have allergies.

Even patients who practice good oral hygiene to control calculus and plaque need to have their teeth professionally cleaned and scaled regularly. Unless you have seen it for yourself, it is hard to imagine what happens to the oral health of patients who either cannot care for their own teeth, or have no one to do it for them. Their mouths are full of plaque, calculus, inflammation, candidiasis, denture sore spots, hypertrophied tissue, loose dentures, xerostomia and even cancer.

In British Columbia, hygienists have taken on the responsibility of caring for these people. Dentists are not in the front line or anywhere near it. The situation is somewhat better in Manitoba. Under the leadership of Dr. Arthur Schwartz and Dr. Douglas Galan, the University of Manitoba has established a Home Dental Care Program that relies on a mobile dental clinic to provide service to nursing homes and some homebound patients. Care is provided by practitioners who are specifically trained in geriatric dentistry, assisted by dental students.

I recently surveyed the 10 Canadian dental faculties on their course guidelines. Of the seven faculties that responded, only one, the University of Alberta, has a specific "geriatric dentistry" course. This course is offered in third and fourth years, and involves 27 hours of lectures and clinics over the two years.

The calendars and course outlines of the other six survey respondents included geriatric dentistry in their elective programs or as a part of the community care program, with no mention of any structured program of lectures or clinics.

In Quebec, McGill University offers a six-weekend, certificate-granting program in geriatric dentistry. The University of Laval also has a program. It sent a dentist to be trained in the United States for

two years. When he returns, he will head a program in geriatric dentistry. Quebec also seems to have an organized system to deliver dental services to the geriatric population.

In Ontario, where the majority of elderly Canadians live, some limited services are provided through public health offices. This occurs in regions where there is an interest, and sufficient finances, to provide examinations and some hygiene care. But the province's two dental faculties have provided no formal leadership in how to develop nursing home dental care programs in communities.

Dental clinical programs have been established in Toronto at Bay-Crest, Queen Elizabeth's Hospital, Sunnybrook Health Science Centre, and the Metro Toronto Community Health Services. Mobile dental services are only offered privately and by the Metro Toronto Community Health Services, however, and very little treatment is performed in mobile dental clinics.

The Ontario government issues a Standard of Care Programs and Services to all nursing homes and long-term care facilities, but it is not mandated and is only paid lip service. The problem is that no one wants to spend money on a quality oral hygiene program or a dental service that would require them to train a team of people in oral health care, and make them responsible for the care and assessment of the patients in a facility.

The Canadian dental profession has a responsibility to solve this dilemma. And it can be done. The Minneapolis-St. Paul metropolitan area has implemented a well-organized program that even includes a research component. Using a state-of-the-art portable dental delivery system, this program is attempting to provide nursing home residents with the same quality of dental care that they previously received from their local dentists. The program is called Apple Tree.

If our provincial governments co-operated by mandating care, and providing a subsidy to the poor through a Medicaid-like pro-

gram that has minimum coverage, we could follow the Minneapolis-St. Paul example and at least try to care for the teeth we have saved.

At St. Peter's Hospital, a geriatric chronic care facility in Hamilton, Ont., we are in the process of developing a made in Canada model that can be adapted to the needs of individual communities. It will be based on a fee-for-service model, and administered by a foundation that is funded in co-operation with a service club or agencies. This should allow the program to become self-sustaining.

We currently have an active treatment clinic in the hospital, and are contracting with five long-term care facilities to provide a mobile treatment service. In addition, we are piloting a preventative care mobile service that will provide cleaning and scaling, as well as refer patients for necessary treatment. This model also includes research and educational components. The educational component is aimed at all long-term care workers (i.e. nurses, RPN's, caregivers, geriatric residents, physicians and dentists). Hopefully we will be able to publish some of our statistics and the results of our model in the near future.

In 1996, the Educational Centre for Aging and Health funded the publication of two papers written by Dr. Sandra Bennett, a senior dental consultant with Population Health Services, Public Health Branch, Ontario Ministry of Health, North York, Ontario, and myself. Both of these papers dealt directly with the topics presented in this article.

The first paper, "Dental Care for Elderly Residents," was published in the May 1996 issue of *Canadian Nurse*. It reported on the results of a survey, which was sent to the directors of provincially regulated long-term care facilities. The survey questionnaire was completed by 21 of 25 directors (84 per cent). This survey addressed four concerns: which staff member are primarily responsible for the maintenance of the residents' oral health care needs; what services are they currently providing; what level of



Table I
Dentists' Self-Perceived Need For Knowledge On Topics Related To Geriatric Dentistry

Topic	Rating* n (per cent)					Missing Values
	5	4	3	2	1	
The demographics of aging.	11 (6)	23 (12)	75 (41)	49 (27)	23 (12)	4
The biological, physiological and psychological changes that occur with aging.	13 (7)	25 (14)	71 (38)	55 (30)	19 (10)	2
Normal aging versus pathological aging.	16 (9)	43 (23)	66 (36)	43 (23)	15 (8)	2
Communications techniques for the sensory-impaired elderly patient.	41 (22)	51 (28)	53 (29)	31 (17)	7 (4)	2
Functional limitations that frequently occur with age and their dental implications.	12 (7)	33 (18)	76 (41)	48 (26)	13 (7)	3
The clinical assessment of the elderly patient for sensory and functional impairment.	28 (15)	47 (25)	69 (37)	31 (17)	8 (4)	2
Clinical decision making for the frail and/or medically compromised elderly patient.	17 (9)	37 (20)	69 (37)	48 (26)	12 (7)	2
Preventive strategies for the elderly patient.	13 (7)	27 (15)	62 (34)	63 (34)	17 (9)	3
Drug induced dental disease.	16 (9)	37 (20)	68 (37)	52 (28)	10 (5)	2
Potential drug interactions between dental medications and medications commonly consumed by the elderly.	30 (16)	34 (18)	63 (34)	41 (22)	14 (8)	3
Management of a medical emergency during the treatment of an elderly patient.	30 (16)	48 (26)	44 (24)	47 (25)	12 (7)	4
Awareness of, and sensitivity to the emotional aspects of dealing with the dying patient.	26 (14)	35 (19)	58 (31)	47 (25)	17 (9)	2
The oral implications of systemic disease(s) in the elderly patient.	11 (6)	35 (19)	72 (39)	53 (29)	12 (7)	2
Presentation and diagnosis of oral pathology in the elderly.	12 (7)	37 (20)	66 (36)	52 (28)	15 (8)	3
The impact of oral disease on quality of life.	6 (3)	21 (11)	64 (35)	67 (36)	25 (14)	2
Elder abuse and the dentist's role in diagnosis.	29 (16)	49 (27)	60 (32)	34 (18)	10 (5)	3
Setting up a dental program in a long-term facility.	60 (32)	45 (24)	47 (25)	18 (10)	6 (3)	8

* 5 = I feel I need much more knowledge in this area / 3 = I feel I need some more knowledge in this area / 1 = I feel I have sufficient knowledge in this area

Percentages may not total 100 due to rounding. (Reprinted from Ontario Dentist 73:48, 1996.)

expertise do they have to perform these duties; and what continuing dental education would enable these staff to perform their duties more effectively.

Overall, the results of the survey indicate the need for a stronger alliance between the dental community and long-term care facilities. Despite the stated importance of dental health to the surveyed facilities and the recommendations of the Ontario Ministry of Health, only one-third of the facilities offered treatment by a dental team, and only a few residents were given an initial dental assessment. The dental community could provide practical support to facilities in both these areas.

From a prevention perspective, it is disappointing that only 11 (52 per cent) of the facilities wanted to provide twice-daily oral hygiene for their residents. One of the most striking findings in this survey was that 18 of the respondents' facilities would like to provide treatment by a dental team.

The second article, "Providing Care For Elderly Patients," was published in the March 1996 issue of *Ontario Dentist*. It reported on the results of a survey to identify the knowledge needs of a group of dentists with respect to treating elderly patients. Of the 238 dentists who were sent questionnaires, 185 completed and returned them (78 per cent). Based on the data collected, we can now design our future continuing education programs to address these issues.

Table 1¹⁰ identified the self-perceived need of participating dentists to increase their knowledge of specific topics related to geriatric dentistry.

The results show that 38 per cent of the dentists spend more than 19 per cent of their clinical time treating elderly patients. They also indicate that there is a need for further skills training to raise the dentists' comfort level. Twenty-five per cent of the respondents indicated that they "never" or only "some of the time" felt comfortable in treating medically-compromised or frail elderly patients. Only 16 per cent responded that

they felt their current knowledge base and experience enabled them to feel comfortable dealing with elderly patients and caregivers "some of the time" or "never." It is also a concern that 38 per cent reported having difficulty accessing the information on geriatric patients that they required for the provision of dental treatment.

There is definitely a need for further education for both the directors of long-term care facilities and dental professionals. Only when the educational needs of these two groups are met will the elderly residents of long-term care facilities and the homebound be assured of the best dental care possible. This will happen when the discipline of geriatric dentistry is finally recognized.

Dr. J.P. Morreale practices in Hamilton, Ontario, and specializes in prosthodontics, as well as restorative and geriatric dentistry.

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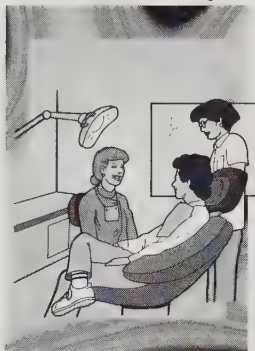
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FEATURE



Dental Practice Review In Ontario

John P. O'Keefe, B.Dent.Sc., M.Dent.Sc., MBA

Background

In early 1998, the Royal College of Dental Surgeons of Ontario (RCDSO) initiated dental practice reviews across the province as part of its Quality Assurance Program.

When the review program is fully implemented, RCDSO proposes to visit approximately 300 randomly selected dental offices annually.

According to Dr. Don McFarlane, RCDSO's director of professional practice, rather than being a punitive program to search out "bad apples," the intent of the Quality Assurance Program is to provide a true learning experience.

The program is mandated under Ontario's 1991 Registered Health Professions Act. Quebec is the only other jurisdiction in Canada that currently conducts office inspections. These reviews are conducted under the auspices of the provincial dental licensing authority, l'Ordre des dentistes du Québec.

RCDSO ran advertisements in its newsletter, *Dispatch*, during 1997 to seek potential reviewers for Ontario's dental practice review program. After a series of interviews, 10 dentists with considerable experience in general practice were selected to conduct the reviews.

The selected reviewers were trained at RCDSO's Toronto head-

quarters under the supervision of Dr. McFarlane. To gain first-hand experience conducting practice reviews in the field, they visited each other's offices, plus those of several RCDSO quality assurance committee members and RCDSO council members, at the end of 1997.

How I Got To Observe

Dr. Douglas Smith, an Ottawa general dental practitioner in solo practice, is one of the first dentists I met on moving to Ottawa in 1997, and an elected dentist member of the RCDSO. I visited his office on a number of occasions during the fall of 1997 and winter of 1998. On one such visit, he invited me to witness a practice review that was due to take place at his office the next day. He checked with Dr. McFarlane at RCDSO, who agreed that I could witness the visit, take some photos, and report on my observations in the *Journal*.

Dr. Smith's dental practice review was scheduled for January 8, in the height of the now famous ice storm that devastated much of eastern Ontario and western Quebec, and left thousands of Canadians without electricity for weeks on end. Despite the state of emergency that was declared in Ottawa that afternoon, the review went ahead. It is a tribute to the dental

practitioners of the region that they continued to provide dental services, despite the appalling weather conditions.

The Practice Review Itself

This practice visit was unusual in that it involved two reviewers, who worked together to review Dr. Smith's office as a calibration exercise.

Both Drs. Mike Bouris of Ottawa and Ross Erwin of Bowmanville were enthusiastic about their experiences to date as trainee reviewers.

"One of the most interesting things about this program is what I can learn from other practitioners," said Dr. Erwin when I asked him what prompted him to apply to become a reviewer.

Both reviewers are experienced general practitioners who have practised in various settings during their careers.

Dr. Smith saw patients throughout the dental practice review visit with virtually no disruption to his normal routine. Certainly, the patients in his office that day would not have been aware that there was anything unusual going on.

The office manager, Lorraine Higgins, spent the most time with the reviewers. However, Dr. Smith scheduled some time, just before

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NUTRITION BITES

Nutridentially Yours

The Dairy Bureau of Canada regularly brings nutritional messages to the attention of consumers, physicians, nurses, and dietitians. The one group we've missed until now is yours: the dentists of Canada. Well, it's time to make up for lost time. This is the first in a series of quarterly columns about the impact of sound nutrition on dental health. We hope you'll find them informative, interesting, and perhaps even compelling.



Since your input is always welcome, please contact us with your comments or suggestions. We may be reached toll-free at **1-800-361-4632**.

Strong Teeth, Strong Bones.

The new, higher calcium recommendations in the United States, and the expectation of higher recommendations here in Canada, have received a great deal of attention. In case you're unaware of the numbers, adolescents are advised to consume an extra 200 to 600 mg/day; individuals aged 19-49, 200 to 300 mg more per day; and those 50 and over, an additional 400 mg/day.^{1,2} Calcium recommendations are based on maximal calcium retention and rest on the fact that, since over 99% of the total body calcium is found in the bone, increased calcium retention results in greater bone density. There is, however, a plateau intake level, i.e., the level above which additional dietary calcium will not increase retention. By extension, this is also the lowest intake at which dietary calcium-dependent

accretion is maximized. Of course, even with this intake level adults may still continue to lose bone as a result of estrogen loss, smoking, inactivity, etc.

New Calcium and Vitamin D Recommendations¹

Age	Calcium (mg/day)	Vitamin D (µg/day)
9-18	1,300	5
19-49	1,000	5
50-70	1,200	10
71 +	1,200	15

Vitamin D recommendations have also been substantially increased for all age groups and are based on the amount of vitamin D needed to maintain serum 25(OH)D concentrations that will prevent rickets in children or osteopenia in adults.^{1,2} Recommendations have doubled for children, adolescents and adults (age 9 to 70) and tripled for the elderly (>70 years of age).^{1,2}

Cheers for Cheese!

A causal relationship between the consumption of sugar and the development of coronal caries is well established. But what about root caries? The Forsyth Specialized Caries Center undertook to examine the effects of sugar and other dietary factors on root caries and found that increased intake of sugary food increases the risk and that habitual consumption of milk products, especially cheese, has the opposite effect.³ For purposes of analysis, the 274 adult subjects (age 44 to 64 years) were classified as belonging to one of three groups: diseased – those who had recession and at least one active root carious lesion (n = 107); healthy – those with recession but no carious lesions or restoration on the root surface (n = 48); and mixed – those who had recession and restorations, but no active carious lesions (n = 119). Dietary intakes were

evaluated and a stepwise multiple regression analysis was computed to assess which of the nutritional variables – i.e., the weekly consumption of sugars, starches, cheese, fruits and fruit juices, noncariogenic foods and dairy products – differentiated the groups of participants. The results indicated that healthy participants consumed more cheese,

Odds Ratio of Developing Root Caries³ (95% CI)

Exposures	Sugar (daily)	Cheese (weekly)
2	1.26	0.74
3	1.42	0.64
4	1.60	0.55
5	1.79	0.47

dairy products, fruits and fruit juices and less sugars and starches, whereas the diseased group consumed twice the sugary liquids (e.g., tea or coffee with sugar) and one and half times more cakes and cookies (an average of 40% more sugar



Increases in the elderly population and the length of time people retain their teeth, combined with the high prevalence of root caries in seniors, emphasize the importance of measures such as increased cheese consumption to prevent root caries.

and 32% more starch). The mixed group's intake fell between the other two but resembled more closely the diseased group. There was no difference in the consumption of noncariogenic foods among the groups. This study confirmed that increased sugar intake can increase not only coronal, but root caries as well, and that the caries-protective characteristic of cheese, noted for coronal caries,^{4,6} has been extended to root caries.^{3,4}

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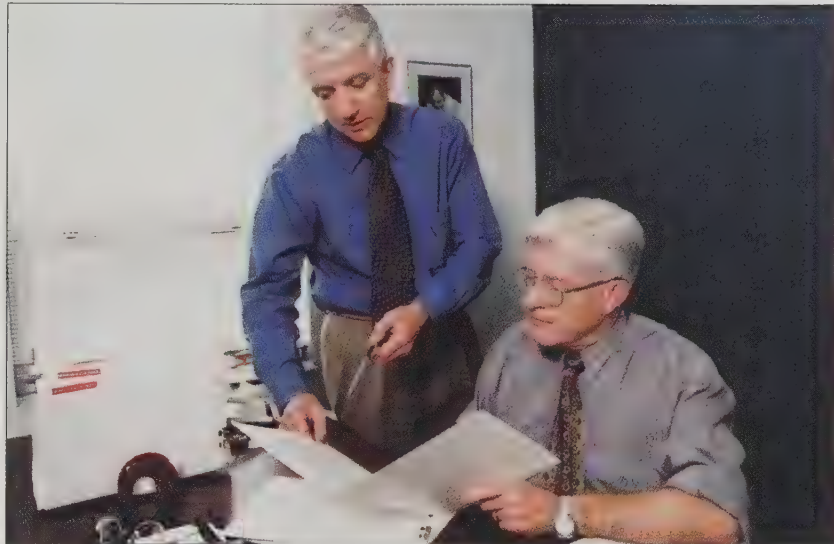


lunch, to discuss the results of the review with them.

Each reviewer had a checklist divided into two main sections: "facility review" and "member-specific review." The facility review section consisted of an examination of the physical facilities, X-ray safety, sedation/anesthesia facilities, infection control protocol, drug storage, and dental office emergency protocols. In turn, the member-specific section involved an examination of Dr. Smith's continuing professional development and his patient records.

During the review, the reviewers went to the chart cabinet and randomly chose a dozen charts for examination. At a general level, they systematically examined: how patient information is recorded; how diagnoses are recorded, and whether they are consistent with the case notes; as well as how treatment plans are recorded and communicated to patients.

The reviewers looked at the daily records written on the charts in more detail. They placed particular emphasis on checking the comprehensiveness of the entries, and whether the entries were clearly attributable to the treating professional (either the dentist or hygienist). The office's financial records were also examined to see if they captured the necessary information. In addition, the reviewers wanted to know if the office retained copies of dental claim forms for two years.



Dr. Mike Bouris discusses record-keeping with Dr. Doug Smith.

The reviewers worked their way methodically through their check list. They were accompanied by the office manager at all times as they examined various parts of the office, and always discussed their observations with her. From my perspective, it appeared as if they were holding a dialogue and exchanging information about the office. The whole exercise took just over half a day. It probably would have taken the best part of a day in a multi-surgery office.

At the end of the review, the reviewers discussed their findings with Dr. Smith and his team in a non-threatening way. What was most interesting to me about this part of the exercise was that the discussion focused on how certain protocols that the reviewers had commented on could be improved.

My Impressions Of the Review

I was impressed that the office visit was a good humored affair. There appeared to be a genuine desire on the part of Dr. Smith and his staff, as well as the RCDSO reviewers, to learn from the experience. There was much discussion about how things

were done at the office and the rationale for various protocols and procedures.

The reviewers appeared to take their role very seriously, and were thorough in their method of working through their checklist. Record keeping, infection control, and emergency protocols seemed to be the areas on which they placed most emphasis. There was no review of Dr. Smith's clinical work.

Avedis Donabedian, who could be described as the father of quality assurance, describes the need to assure quality in the "structure," "process," and "outcomes" of health care. The RCDSO practice review that I witnessed focused completely on the structure and process of care.

I found the review an interesting exercise to observe. It struck me as being an example of the professional ideal: professionals helping each other to improve for the benefit of their patients.

On the strength of observing this office visit, my feeling of pride as an Ontario-registered dentist was reinforced. I feel secure in the knowledge that this program will help us to regulate our own affairs for the well-being of the public.

Dr. John P. O'Keefe is the editor of the Journal.



Dr. Ross Erwin examines infection control protocols with office manager Lorraine Higgins.

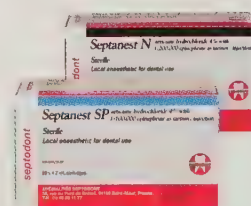
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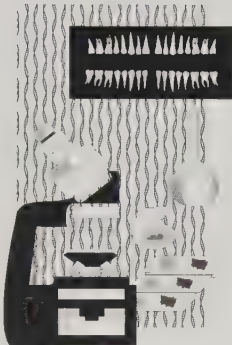
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RESEARCH



Patient Satisfaction With Dentures Made By Dentists and Denturologists

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ABSTRACT

Background

Within Quebec and elsewhere in Canada, patients requiring removable prostheses consult either dentists or denturologists. In this article, we describe the socioeconomic characteristics of 410 edentulous individuals seeking replacement of their dentures, and compare the levels of satisfaction experienced by the patient groups provided with conventional dentures by dentists and by denturologists.

Methods

All subjects responded to announcements seeking participants in a clinical trial. The announcements indicated that all participants would receive new prostheses. Data were collected via telephone interviews. Sociodemographic variables included sex, age, education level and family income. Subjects were asked to evaluate their present maxillary and mandibular prostheses for general satisfaction, stability, comfort, ability to chew, ability to clean and appearance. Age, cost and the provider (dentist or denturologist) of the original prostheses were also recorded, and responses were then compared

between the groups of subjects treated by dentists (N=91) and denturologists (N=319).

Results

There were no significant differences in the sociodemographic characteristics of the two groups, except for a small difference in mean age (two years). Both groups had paid approximately the same amount for their complete prostheses. As expected, most individuals were satisfied with their maxillary prostheses, but dissatisfied with their mandibular prostheses. Significantly more subjects in the denturologist treatment group than the dentist treatment group gave their mandibular prostheses a poor rating for general satisfaction ($p=0.003$), comfort ($p=0.04$) and stability ($p=0.016$).

Conclusions

These results suggest that the edentulous patients treated by dentists and denturologists share similar sociodemographic characteristics, and pay a similar cost for treatment. However, those treated by denturologists seem to be more dissatisfied with their mandibular prostheses than those treated by dentists.

Introduction

Edentulism is viewed as an impairment since it limits two of the functions necessary for survival: the ability to nourish oneself and to speak. Even when prostheses are in excellent condition, functional limitations still occur. Locker reports that a substantial proportion of Canadian adults over 50 years of age have reported oral health problems that compromise their quality of life, such as problems with eating certain foods, avoidance of social occasions involving eating, or oral or facial pain.¹ Many of these problems can be significantly reduced with implant-supported prostheses.² The great majority of patients will still be wearing conventional dentures for the foreseeable future, however, because they cannot afford the alternatives. Despite the general decline in the rate of edentulism in Quebec,³ edentulism is still two times more prevalent in the province than it is in the United States.^{4,5} It is therefore very important to ensure that this population receives adequate conventional dentures.

In 1972, Quebec had the worst rate of edentulism in Canada.⁶ Believing it would increase public access to dental prosthetic services, and eventually improve the dental

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health status of the population, the Quebec government granted legal status to denturologists (denturists) in 1973.⁷ As a result of this action, denturologists were recognized as legitimate providers of removable complete or partial dentures.^{8,9} To be licensed as a denturologist, and be allowed to provide these services, students train for three years in a college level program.

The faculties of dentistry at McGill University and the Université de Montréal have been carrying out a series of clinical trials involving edentulous individuals. When patients phoned in response to advertisements requesting participants for a clinical trial, they were asked a series of questions related to inclusion and exclusion criteria, their sociodemographic status and their satisfaction with their current dentures. In this paper, we report on the satisfaction of patients who were provided with conventional dentures by either dentists or denturologists.

Method

Sample

The patients described in this study were edentulous, lived in the Montreal area, and answered advertisements describing clinical trials of intraoral prostheses. The first group of patients (N=234) responded to an invitation to participate in clinical trials of implant prostheses. Participants for this project were located through advertisements in several French-language newspapers, as well as through radio announcements. The advertisements offered potential participants an opportunity to receive implant prostheses for the mandible and the maxilla at no cost. Subjects were interviewed by telephone between April 1992 and July 1993.

The second group of patients (N=176) were offered an opportunity to replace their dentures at a modest fee if they participated in a research project. Telephone interviews were conducted between February 1995 and February 1996.

Questionnaire

The questionnaires included sociodemographic items such as age, sex, level of education and family income. Patients were asked if their dentures were made by a den-

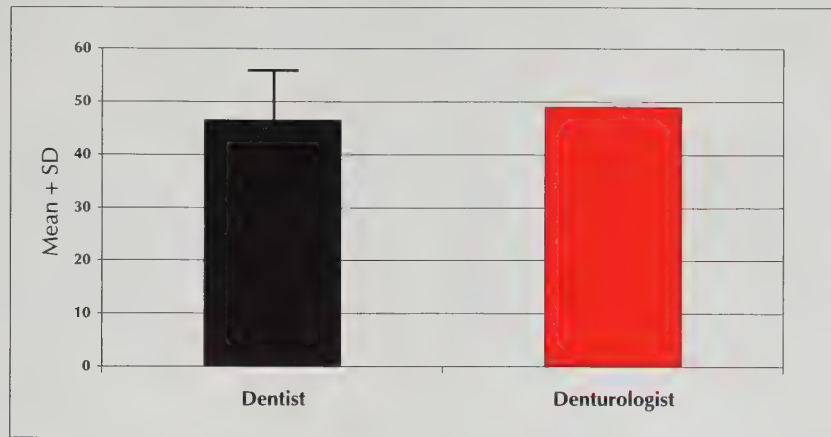


Fig. 1a: Subject age.

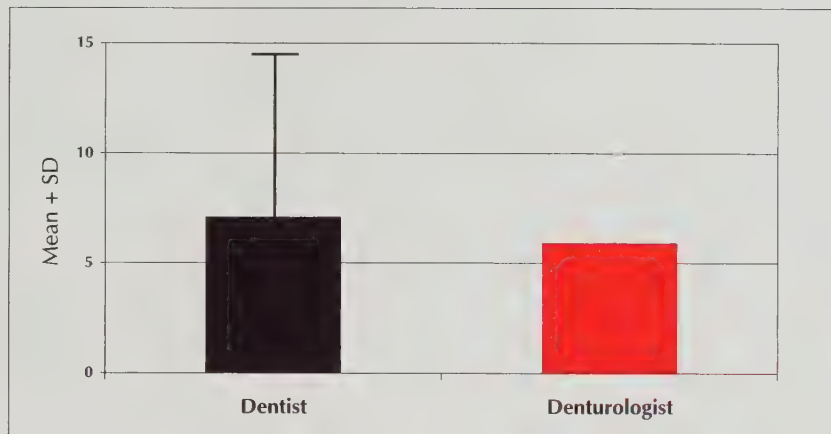


Fig. 1b: Prosthesis age.

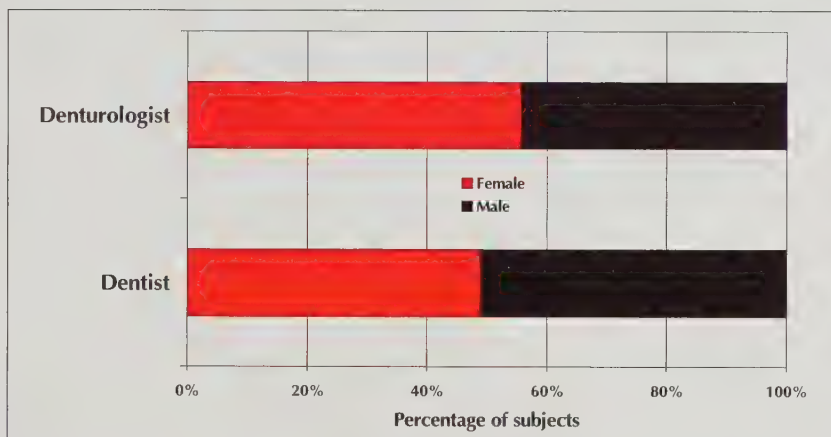


Fig. 1c: Sex distribution.

Figs. 1a, 1b, 1c: Sociodemographic characteristics of subjects treated by dentists and denturologists. Subjects seen by a denturologist tend to be slightly older than those seen by a dentist (a) (t-test, $t=2.01$, $df=284$, $p=0.05$). The prostheses were equally old (b) for the two groups (Mann-Whitney U-test, $df=1$, $p=0.43$), and the proportion of male and female subjects were also similar (c) ($\chi^2=1.32$, $df=1$, $p=0.25$)

tist, a dental student or a denturologist, how much they paid for their dentures, and the age of their dentures. They then rated their satisfaction with their mandibular and maxillary denture for each of the following criteria: general satisfac-

tion, stability, comfort, ability to chew, ability to clean, and appearance. Satisfaction levels were recorded using a zero to nine category scale, with zero representing "not at all satisfied" and nine representing "completely satisfied."

Statistical Tests

Results were analysed with appropriate parametric or non-parametric tests according to data type. The Mann-Whitney U-test was used to analyse categorical data, such as income (less than \$20,000, \$20,000-\$30,000, \$30,000-\$40,000 or more than \$40,000), level of education (primary, secondary, college or university) and satisfaction (0,1, etc). Chi-square analysis was used to compare the proportions of male and female patients between the two groups. When continuous data were not normally distributed, as in age of prosthesis, we used non-parametric tests. The student's t-test was used to compare the mean age of the two groups of patients. Significance was accepted at the five per cent level (Systat 6.0, SPSS Inc.).

Results

Four hundred ten subjects, from 30 to 74 years in age [mean = 49 ± 9 (SD) years], participated in the interviews. Fifty-four per cent of the respondents were female. The age of the subjects' current dentures ranged from less than a year to 40 years [mean = 6 ± 6 (SD) years]. Twenty-one per cent of the prostheses were provided by a dentist (N=87), one per cent by a dental student (N=4), and 78 per cent by a denturologist (N=319). Because the sample was small, the subjects whose prostheses were made by a dental student were included in the dentist group.

Sociodemographic Data

Except for age, the measures of sociodemographic characteristics were similar for the two groups of subjects. The individuals treated by a denturologist tended to be slightly older than those treated by a dentist (Fig. 1a; t-test, $p=0.05$). This difference was minimal, however, with only two years separating the group means. Furthermore, the prostheses were of equal age (Fig. 1b, Mann-Whitney U-test, $p=ns$), and the proportion of males and females were comparable (Fig. 1c, X^2 , $p=ns$). Finally, the education levels and family incomes of the two groups (Figs. 2a and 2b) were not statistically different (Mann-Whitney U-test, $ps=ns$).

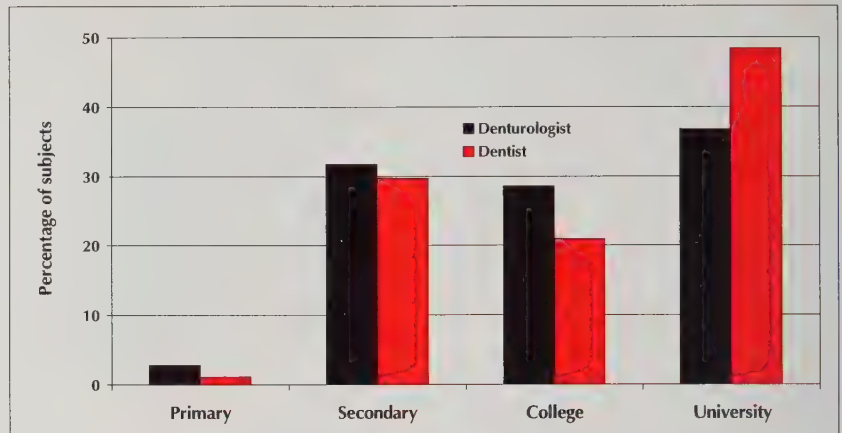


Fig. 2a: Level of education.

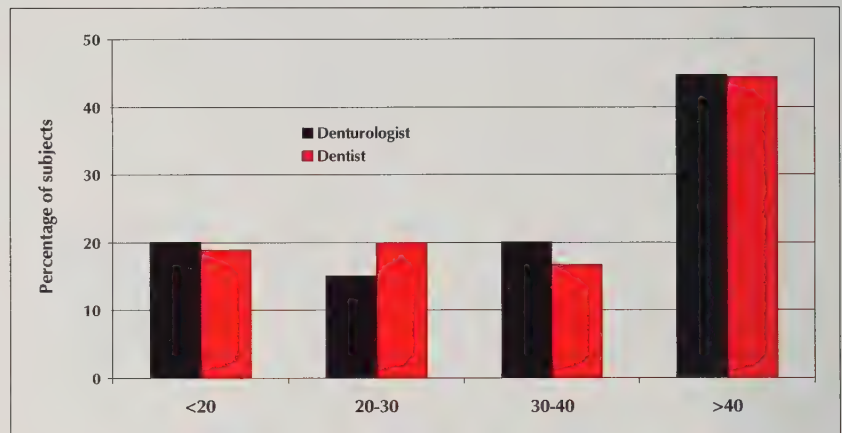


Fig. 2b: Income (thousand dollars).

Figs. 2a, 2b: Level of education (a) and family income (b) of the two groups of subjects were similar (Mann-Whitney U-test, $dfs=1$, $p=0.12$ and $p=0.89$, respectively).

Cost Of Prosthesis

On average, patients treated by denturologists paid $\$710 \pm 330$ for their complete prostheses, while those treated by dentists paid a mean amount of $\$750 \pm 775$. However, there was no statistical difference between the groups (Mann-Whitney U-test, $p=0.6$). The larger standard deviation associated with the second group was due in large part to three subjects who did not pay anything for their prostheses, and one subject who paid \$5,000. Furthermore, there was no relationship between the ratings of general satisfaction and the cost of the prostheses ($r=0.03$, $ps=ns$).

Patient's Satisfaction With Their Prostheses

General Satisfaction

In general, the majority of subjects from both groups were equally satisfied with their maxillary prostheses (Fig. 3a; Mann-Whitney

U-test, $p=0.18$). Fifty-eight per cent of all subjects assigned a rating of 8 or 9 for general satisfaction to their maxillary prostheses. In contrast, only 14 per cent of all subjects were as satisfied (ratings of 8 or 9) with their lower prostheses (Fig. 3b). Significantly fewer of the patients treated by denturologists evaluated their general satisfaction with their mandibular prostheses as high ($p=0.003$).

Comfort

The same tendency was observed with evaluations of comfort. Most subjects gave the comfort of their maxillary prostheses a high rating (Fig. 4a), and there was no difference in the distribution of satisfaction ratings between those treated by dentists and those treated by denturologists ($p=0.19$). However, mandibular prostheses scored significantly lower than maxillary prostheses for comfort, and the patients treated by

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denturologists assigned them significantly lower comfort ratings than the patients treated by dentists (Fig. b, $p=0.04$).

Stability

Following the general trend, the maxillary prostheses (Fig. 5a) were rated higher for stability than the mandibular prostheses (Fig. 5b). In this case, however, both the maxillary and mandibular prostheses were more highly rated by the patients treated by dentists than those treated by denturologists ($p=0.025$ and $p=0.016$, respectively).

Appearance

The appearance of their maxillary (Fig. 6a) and mandibular prostheses (Fig. 6b) were rated equally by the patients treated by dentists and those treated by denturologists. Ratings for ease of chewing and ease of cleaning (not shown) were also similar for both groups ($ps=ns$).

Discussion

In an analysis of a sample of edentulous patients who were seeking to replace their old dentures during clinical trials, the original dentures provided by dentists versus those provided by denturologists were rated and compared. We were surprised to find that the mandibular dentures provided by denturologists were rated to be less satisfactory than those provided by dentists. These discrepancies could not be explained by differences in the cost or age of the dentures. Furthermore, no differences were found for almost all of the socioeconomic factors investigated. The sex distribution, level of education and family income were comparable for the two groups. Although patients treated by denturologists tended to be older, only two years separated the group means.

In Finland, Tuominen also reported that denturologists tend to provide dentures to older patients. Contrary to our findings, however, he also found that denturologists treat people with lower incomes.¹⁰

The price paid for a treatment can influence the recipient's satisfaction. It could be expected that consumers would be more satisfied with a more expensive product than a cheaper one. On average, however, both groups of pa-

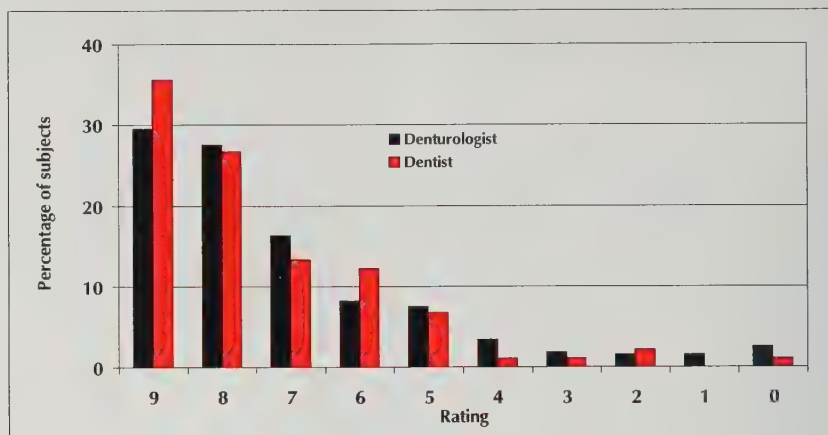


Fig. 3a: Satisfaction (maxillary prostheses).

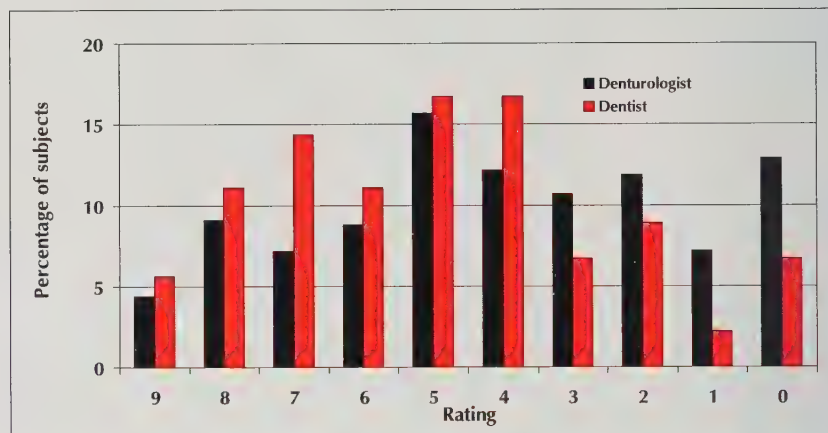


Fig. 3b: Satisfaction (mandibular prostheses).

Figs. 3a, 3b: General satisfaction ratings for maxillary (a) and mandibular prostheses (b) provided by dentists (■) and denturologists (■). A rating of 9 indicates complete satisfaction. Patients were highly satisfied with their maxillary prostheses (a) and there was no difference between providers (Mann-Whitney, $df=1$, $p=0.19$). However, satisfaction with mandibular prostheses is not as good (b), with denturologists' patients being less satisfied than those treated by dentists (Mann-Whitney, $df=1$, $p=0.003$).

tients in this study paid the same amount for their dentures, and there was no correlation between satisfaction levels and the price that individuals had paid for their prostheses ($r=0.03$).

Older dentures could be expected to be less satisfactory than new ones. This cannot explain our results, because there was no between-group difference in the age of the prostheses. The finding that subjects seeking replacement of their complete dentures are generally satisfied with their maxillary, but not their mandibular prosthesis, was expected. In agreement with our results, Misch and Misch found that the vast majority of edentulous patients seeking treatment in an implant clinic were dissatisfied with the function, stability,

retention, comfort and appearance of their mandibular prostheses.⁴

Two earlier studies failed to find any difference in patient satisfaction based on the training of the provider.^{10,11} The main difference between these studies and ours is that they included patients who were not seeking to replace their prostheses. Additionally, they included partially dentate subjects, while only edentulous subjects were studied in this investigation. Furthermore, differences may have been missed. Data for both maxillary and mandibular prostheses appear to have been merged in one case,¹¹ and the author of another study¹⁰ does not seem to have asked subjects to evaluate their maxillary and mandibular prostheses separately. This could be important, since we have shown that

patients were dissatisfied with their mandibular prostheses, but highly satisfied with their maxillary prostheses. High ratings for maxillary prostheses might hide potential differences in satisfaction levels between the two groups of patients.

It could be suggested that our results imply that the technical quality of the prostheses supplied by denturologists and dentists is different. We asked about satisfaction levels, and it has been shown that patient satisfaction does not necessarily reflect technical quality. Haas-Wilson reported that patient satisfaction was independent of the technical quality of eyeglasses, but was related to the interpersonal quality and the processes of care.¹² However, if these were major factors, they should have had an equal influence on the ratings of satisfaction with the maxillary prostheses. Patient reports of their satisfaction with treatment is now accepted as being the primary criteria for treatment success.^{13,14}

The data presented here were gathered from individuals who were seeking replacement prostheses, which implies that the subjects were more dissatisfied with their present prostheses than the average patient. To determine whether our findings apply to the general edentulous population of Quebec, a survey of a representative sample of this population should be carried out.

In conclusion, the analysis of a sample of edentulous patients suggests that dentists and denturologists treat similar populations and charge comparable fees for complete removable dentures. Both groups of patients seeking treatment were generally satisfied with their maxillary prostheses, but were much less satisfied with their mandibular prostheses. More patients treated by denturologists were dissatisfied than those treated by dentists.

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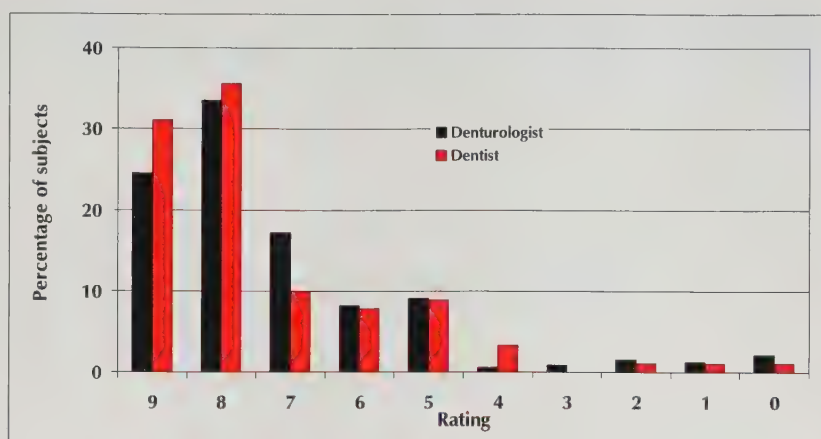


Fig. 4a: Comfort (maxillary prostheses).

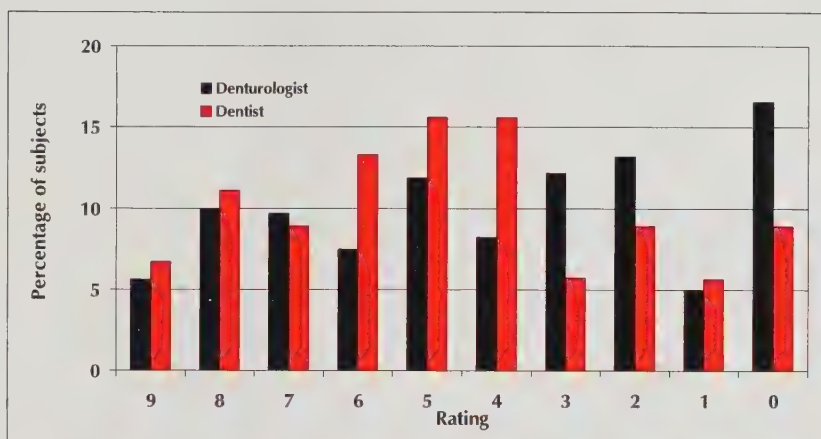


Fig. 4b: Comfort (mandibular prostheses).

Figs. 4a, 4b: Evaluations of comfort with the maxillary (a) and mandibular prosthesis (b). Maxillary prostheses were rated as more comfortable than mandibular prostheses by both groups of subjects. For mandibular prostheses, comfort was rated higher by subjects whose prostheses were provided by dentists than those whose prostheses were provided by denturologists (Mann-Whitney, $df=1$, $p=0.04$).

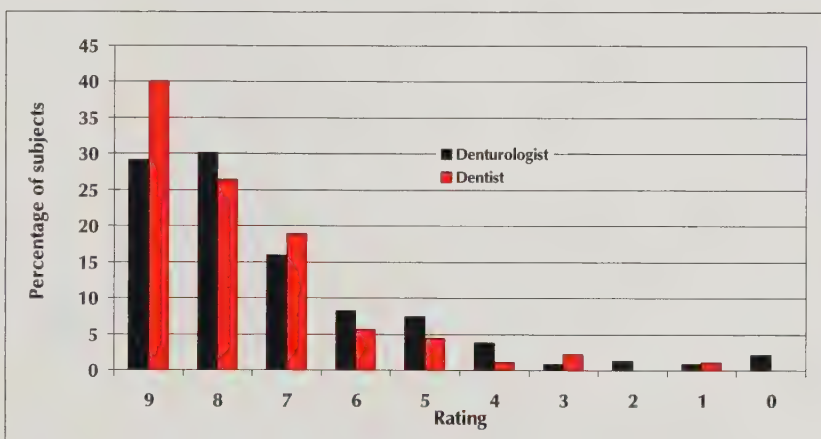


Fig. 5a: Stability (maxillary prostheses).

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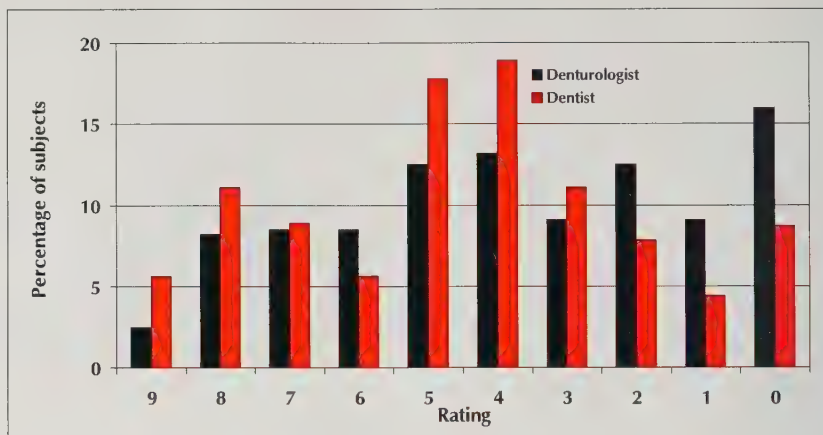


Fig. 5b: Stability (mandibular prostheses).

Figs. 5a, 5b: Evaluations of stability with the original maxillary (a) and mandibular (b) prostheses. Maxillary prostheses were rated as more stable than mandibular prostheses, and patients treated by dentists rated both prostheses as significantly more stable than those treated by denturologists (Mann-Whitney, $dfs=1$, $p<0.03$).

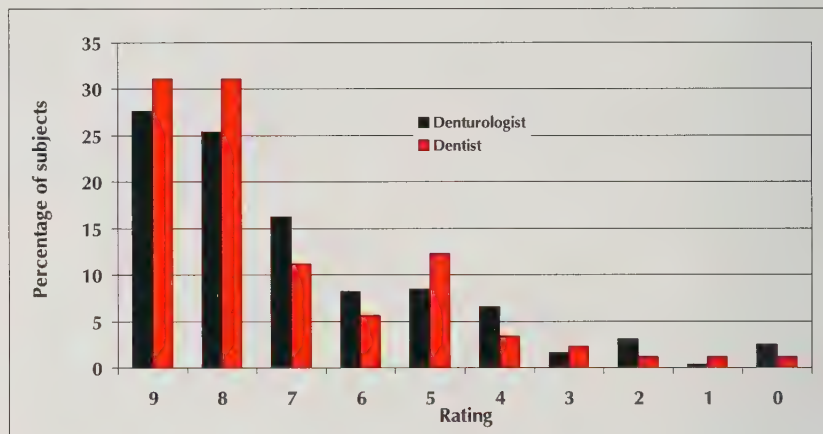


Fig. 6a: Appearance (maxillary prostheses).

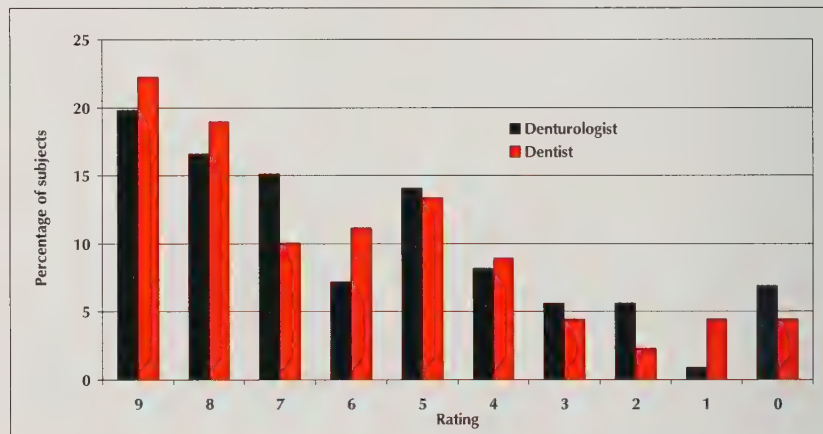


Fig. 6b: Appearance (mandibular prostheses).

Figs. 6a, 6b: Evaluations of appearance for maxillary (a) and mandibular (b) prostheses. Subjects were more satisfied with the appearance of their maxillary prostheses than with their mandibular prostheses. Satisfaction ratings did not differ between the groups (Mann-Whitney, $dfs=1$, $p=0.25$ and $p=0.49$, respectively).

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RESEARCH



Determinants Of Positive and Negative Attitudes Toward Dentistry

Allison Rice, B.Sc.
Andrée Liddell, PhD

ABSTRACT

Previous studies have primarily investigated the determinants of negative attitudes toward dentistry. Little is known about the reasons for positive attitudes. Using a group of university students who were surveyed during 1996, this study therefore examined both positive and negative attitudes to dentistry. It was initially predicted that dentally anxious individuals would be more likely to have negative feelings about dentistry than non-dentally anxious individuals, and would attribute this attitude to specific experiences. The study found that the majority of participating students had a positive attitude toward dentistry, and that participants with low levels of dental anxiety were more likely to have a positive attitude than those with a high level of anxiety. However, highly dentally anxious individuals were just as likely to feel positive toward dentistry as they were to feel negative. A substantial proportion of students claimed to have had painful or distressing experiences at the dentist during their adolescence. However, experiencing a painful or distressing incident was not related to having a negative attitude. The majority of the students

who felt negative toward dentistry attributed this attitude to an un-specific experience, although dentally anxious individuals were likely to be more specific than non-dentally anxious individuals. Women participants appeared to have experienced painful or distressing incidents at a younger age than the men. The authors concluded that the factors involved in the development and maintenance of an individual's attitude toward dentistry are complex, and that dentists should be concerned with the promotion of positive attitudes rather than attempting to resolve negative ones.

Dental fear has been found repeatedly to be a barrier to oral health.¹⁻⁶ This fear is manifested in several ways, such as anticipating being afraid, avoiding dental check-ups, and seeking treatment only under general anesthesia,⁷ and occurs in individuals from all segments of the population. Dentally anxious patients are known to be a common source of stress for dentists.⁸ Although the recent advances in local anesthesia and treatment techniques have made pain-free dentistry a virtual reality, the fear of pain remains a problem for some individuals.⁹

Research suggests that dental anxiety can be learned directly from previous negative dental experiences, or indirectly from others including family members, friends and the media.⁷⁻⁸ Painful or distressing dental incidents experienced at an early age appear to have a more damaging effect than incidents experienced at a later age, which allow dental patients the opportunity to develop positive expectations from dentistry to balance the negative ones.^{4,10}

However, some people who acknowledged having dental fear also admitted to having other fears, including the fear of suffocating, pain, death of a loved one, and hypodermic needles.¹¹ Another study indicated that individuals who reported having excessive fears, in addition to those relating to dentistry, were more likely than less fearful individuals to carry their dental fear into old age.¹² General fearfulness is therefore suggested as a possible mediator in the development and maintenance of dental fear.

Not surprisingly, previous studies have focused largely on trying to understand the reasons why people become dentally anxious, and have assumed that dental anxiety causes patients to have negative feelings about dentistry. Little

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is known about the reasons for positive attitudes toward dentistry. Therefore, this study attempted to identify the determinants of both positive and negative attitudes toward dentistry.

Initially, it was predicted that dentally anxious individuals would be less positive about dentistry, more likely to give specific reasons to explain their attitude, and more likely to have experienced painful or distressing dental incidents at an earlier age than non-dentally anxious individuals. Due to the absence of information on the subject, it was not possible to make clear predictions regarding the determinants of positive attitudes. However, it was anticipated that there would be an inverse relationship between the factors known to be implicated in negative attitudes and those that might lead to positive attitudes.

Methods

Data was obtained using a specially designed questionnaire, which was distributed to groups of university students at Memorial University in Newfoundland during January 1996.

Sample

The questionnaire was circulated to 452 students registered in a variety of faculties during class periods. First-year classes were chosen in preference to later years, because they usually include the largest number of students.

Questionnaire

The study was part of a larger study.¹³ Only those items that relate to this specific investigation will be described. The questionnaire included three parts, each of which was printed on a separate page. These parts were designed to obtain data on the participants' demographics, level of dental anxiety, and attitude toward dentistry, as follows:

1. **Demographics.** Students were asked to state their age, gender, faculty and year of study. This part of the questionnaire was preceded by an introduction: "We are interested in your attitude toward dentistry, and we would be very grateful if you would please complete this

Table 1

Frequency Of Reason(s) Reported By the Students To Be Important In Determining Their Attitude Towards Dentistry*

Reason	n
Positive attitude	
Future benefits	65
Dentist's personality	40
Good oral health	24
Positive behavior of dentist	21
Dentist's attitude	20
Professionalism and competency	18
Attractiveness	15
Good dental experience	13
Neutral attitude	
Influenced by others	11
Dental environment	7
Dental problem	2
Negative attitude	
Pain and discomfort	56
Invasive procedure	41
Cost of dental treatment	13
Unspecified aversive experience	13
Negative behavior of dentist	9
Uninvasive procedure	6
Repeated exposure	4
Aversive childhood experience	3
The waiting	2
Specified negative stereotype	2
Unfrozen gums	2
Unspecified aversive childhood experience	1

* Some individuals reported more than one reason.

questionnaire anonymously." It ended with the line, "Thank You For Your Cooperation!"

2. **Level of dental anxiety.** Dental anxiety was measured by the Corah Dental Anxiety Scale (CDAS).¹⁴⁻¹⁵ The CDAS is a brief self-rating measure of dental anxiety, and is widely used¹⁶ because of its excellent psychometric properties. Participants are asked about their feelings concerning four situations related to dentistry, namely: if you had to go to the den-

tist tomorrow; waiting in the dentist's office for your turn in the chair; in the chair waiting while the dentist prepares to drill; and in the chair waiting to have your teeth cleaned. The situations are rated on a five-point scale from 1 (relaxed) to 5 (extreme fear), which provides scores ranging from between 4 and 20. A score of 13+ is believed to indicate problematic dental anxiety.¹⁵

3. **Attitude to dentistry.** This part used direct questions to determine

whether the respondent's attitude toward dentistry was positive, neutral, or negative. In addition, participants were asked to identify the most important factor behind their attitude, whether they had experienced a painful or distressing incident at the dentist, and, if so, when that incident occurred.

The order of presentation of the questionnaire's first part was invariant but the other two parts were presented in a counterbalanced order.

Results

Characteristics Of Sample

All 452 students surveyed in this study returned their questionnaires. Some left questions unanswered, however, resulting in some analyses being carried out with less than the full sample. There were 216 men and 236 women participants, with a mean age of 19.67 (SD = 3.18) years. Proportionally, the largest number of participants were in the engineering faculty.

Dental Anxiety

The mean of the participants' CDAS scores was 9.09 (SD = 3.35), and the proportion of students who admitted to high levels of dental anxiety was 16.8 per cent. Consistent with many other studies, women showed significantly greater levels of dental anxiety ($M = 9.75$) than men ($M = 8.34$) [$t(442) = -4.56, p < .001$].

Attitude To Dentistry and Attribution Of Attitude

More students had a positive (36.7 per cent) or neutral attitude (48.5 per cent) than a negative one (14.8 per cent) toward dentistry. Since so few reasons were given to support a neutral attitude (**Table I**), and to simplify the analyses, all participants who showed a positive or neutral attitude were treated as one group. This group's results were compared to the results for the group that had a negative attitude toward dentistry. A 2x2 chi-square test was done to test for differences between attitude (positive/negative) and level of dental fear (low/high). Three hundred forty participants with low dental fear (92 per cent) also had a posi-

tive attitude toward dentistry, compared with the 29 participants with low dental fear (8 per cent) who had a negative attitude. On the other hand, the numbers of high dental anxiety participants with positive ($n=38$) and negative ($n=38$) attitudes toward dentistry were identical. The differences were significant [chi-square (1, $N = 445$) = 84.24, $p < .001$].

Ninety-nine per cent of the reasons participants gave to explain their attitudes toward dentistry could be classified under 23 categories (**Table I**). Two independent raters obtained a correlation of 0.89 between their ratings, and disagreements were easily resolved after discussion. In addition to being classified by their content, the reasons given for the participants' attitudes toward dentistry were classified according to their valence (+/-) and specificity (a remembered event that occurred at a particular time and place). The agreement between two independent raters was over 99 per cent for both of these dimensions.

Not surprisingly, the prediction that dentally anxious individuals were more likely to give negative reasons for their attitude toward dentistry than non-dentally anxious individuals was supported. One hundred and ninety-five participants with a low level of dental fear (72 per cent) gave positive reasons for their attitude, compared with the 77 participants in this group (28 per cent) who gave negative reasons for their attitude. Twenty-six of the participants with a high level of dental fear (39 per cent) gave positive reasons for their attitude, compared with the 41 dentally anxious participants (61 per cent) who gave negative reasons for their attitude. Differences were significant [chi-square (1, $N = 339$) = 24.19, $p < .001$].

Another 2x2 chi-square test was carried out to test for differences between attitude (+/-) and specificity (specific/unspecific) of determining event. Two hundred and sixty-three participants (92 per cent) with a positive attitude toward dentistry attributed their attitude to unspecific events, compared with 23 participants with a

positive attitude (8 per cent) who attributed their attitude to specific events. Similarly, 40 participants with a negative attitude toward dentistry (69 per cent) attributed their attitude to unspecific events as compared with 18 participants with a negative attitude (31 per cent) who attributed their attitude to specific events. Differences were significant [chi-square (1, $N = 344$) = 22.14, $p < .001$]. On the other hand, there was no relationship between the level of dental anxiety and the specificity of attribution.

Painful Or Distressing Experiences At the Dentist

More than half of the students (259) reported having experienced a painful or distressing experience at the dentist. However, the relationship between valence of attitude and having experienced a painful or distressing experience was not as clear as predicted. Eighty-three individuals who had not experienced a painful or distressing event (95 per cent) had a positive attitude toward dentistry, compared with 10 participants who had not experienced a painful or distressing event (five per cent) but had a negative attitude. On the other hand, 202 individuals who had experienced a painful or distressing event (78 per cent) were nevertheless positive about dentistry, compared with the 57 who had experienced a painful or distressing event (22 per cent) and were negative about dentistry [chi-square (1, $N = 452$) = 23.48, $p < .001$].

The average age at which students had their first negative experience was 12.59 years (SD = 4.64). Because men and women showed significant differences in their levels of dental anxiety, a two-way analysis of variance [gender (2) x level of dental anxiety (2)] was carried out. The average age at which dentally anxious students and non-dentally anxious students had their negative experiences was the same. However, the age at which dentally anxious men had their first negative experience ($M = 14.60$ years) was significantly higher than it was for dentally anxious women ($M = 11.83$ years) [$F(1, 236) = 4.63, p < .05$].

Discussion

Contrary to some public opinion, a positive attitude toward dentistry was found to be the rule rather than the exception. The participants in this study were relatively young and well educated, however, and their attitudes may not be representative of the general population, who may be more susceptible to negative stereotypes. Nevertheless, the study provides interesting qualitative as well as quantitative data. The attribution of positive attitudes toward dentistry centred largely on the dentist's personal characteristics and behavior, for example. This was the second most important factor in the development of positive attitudes toward dentistry, second only to the participants' acknowledgment that dentistry provides future benefits and promotes good oral health. The reasons selected most often to explain a negative attitude toward dentistry were to have experienced pain and discomfort, and to have undergone invasive procedures. It may well be that the dentist's behavior is subsumed under these headings, but dentist responsibility was not clearly stated as a reason for having a positive or negative attitude toward dentistry. Instead, treatment or specific procedures were blamed.

Because some students gave more than one reason for their attitude toward dentistry, it may have been better to phrase our question differently by asking them to rank their reasons in order of importance. We can report on the frequency of the various attributions, but not their relative importance. It was unfortunate and unclear why a substantial proportion of participants were unable or unwilling to state the reasons for their attitude. The task may have been more difficult for them than we anticipated. All participants were more general than specific in the type of reasons given for their attitude. However, there was a tendency for those who acknowledged having a negative attitude toward dentistry to be more specific in the reasons they gave to justify that attitude. These individuals may have had less good experiences to counterbalance the bad ones, leading

them to retain more resistant bad memories than the other study participants. Another possibility is that their experiences were more severe and traumatic.

As predicted, there was a relationship between a positive attitude toward dentistry and low dental anxiety. However, individuals with high dental fear were as likely to have a positive attitude as a negative one, suggesting that other factors are of importance. Dental anxiety alone was shown not to be the most important determinant of attitude toward dentistry. It may be that those individuals who are dentally anxious and have a positive attitude toward dentistry blame themselves for being generally anxious, or do not generalize their negativity to all dentists and all experiences.

Experiencing a painful or distressing experience appeared to have been fairly common among the study participants. However, such experiences did not appear to be a sufficient determinant of attitude on their own, as more individuals who had experienced painful or distressing incidents were positive about dentistry than those who had experienced these incidents and were negative about dentistry. Not experiencing painful or distressing incidents appeared to be a better predictor of positive attitude than negative attitude, suggesting that prevention is better than cure.

Differences in the levels of dental anxiety and other anxieties between genders continue to intrigue.¹⁷ The results suggest that women experienced their negative incidents at an earlier age than men. It is impossible to know whether these incidents were more painful and distressing, or if women are more sensitive to such experiences than men. In any case, adolescence appeared to be a sensitive period, and boys and girls may have different needs during that stage of their development.

In conclusion, dentists should be aware of their importance in shaping their patients' attitudes toward dentistry, and that negative experiences, when they occur, need to be balanced by good

ones. Because it is unlikely that a patient's fearful disposition can be much altered, changing his or her experiences of dentistry by engineering a pain-free and suitably safe environment in the operatory is the only preventive or remedial measure possible.

Ms. Allison Rice is a project coordinator of a youth action team in Stephenville, Nfld.

Dr. Andrée Liddell is a professor of psychology at Memorial University.

Reprint requests to: Dr. Andrée Liddell, Department of Psychology, Memorial University of Newfoundland, St. John's, NF A1B 3X9.

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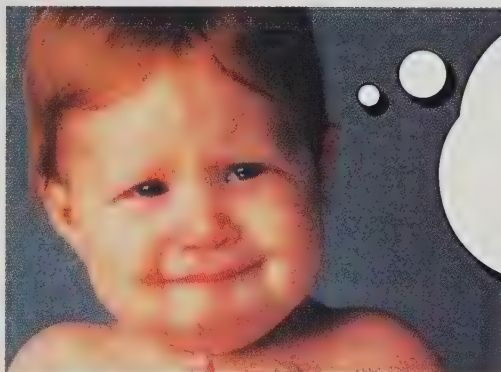
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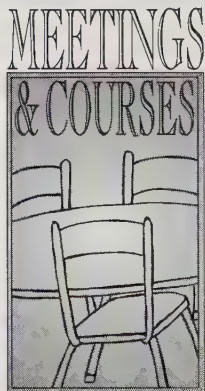
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INTERNATIONAL



March 29 - April 3

4th Endodontic World Congress in Jerusalem, Israel. Contact Dr. Adam Stabholz or Dr. Don Arens, IFEA Secretariat, Fourth Endodontic World Congress, P.O. Box 50006, Tel Aviv 61500, Israel. Tel.: 972 (3) 5140000; fax: 972 (3) 5175674/5140077.

April 23-25

1998 British Dental Association National Dental Conference in Harrogate, England. Contact Ms. Charlotte Long or Ms. Katherine Fort, Conference Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855; e-mail: conference@bda-dentistry.org.uk

June 25-27

5th Dental International Congress of the Turkish Dental Association in Bursa, Turkey. Contact Chamber of Dentists of Bursa, Altiparmak Cad. Petek Ish. K.4, Bursa, Turkey. Tel.: 90 (0) 224-222-69-69; fax: 90 (0) 224-223-53-59.

July 2-4

1st Chinese International Conference on Comprehensive Orthodontics in Nanjing, China. Contact Javisa International Ltd., 425 University Ave., Suite 301, Toronto, ON M5G 1T6. Tel. (collect): (416) 595-9877; fax: (416) 595-9565.

August 25-29

15th Jubilee "Ákrövy" Congress of the Hungarian Dental Association in Budapest, Hungary. Contact MOTESZ Congress Bureau, 1051 Budapest, Nádor u. 36., 1443 Budapest, Pf. 145 Hungary. Tel.: (36-1) 111-66 87; fax: (36-1) 183-79 18; e-mail: motesz@mail.elender.hu; internet: www.motesz.hu.

September 8-11

135th British Pharmaceutical Conference in Eastbourne, England. Contact BPC Secretariat, Royal Pharmaceutical Society of Great Britain, 1 Lambeth High St., London SE1 7JN, U.K. Tel.: 44 (0) 171 820-3241; fax: 44 (0) 171 735-7629.

October 1-3

3rd International Congress On Dental Law and Ethics in London, England. Contact Congress Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855.

October 8-12

86th Fédération Dentaire Internationale Annual World Dental Congress in Barcelona, Spain. Contact the Canadian Dental Association. Tel.: (613) 523-1770; 1-800-267-6354; fax: (613) 523-7736.

October 15-17

Microscope & Future — Multidisciplinary Symposium On the Use Of Microscopic Dentistry in Rome, Italy. Contact Mrs. Paola Mercaldo, G&G Congressi, 00143 ROMA, Via Tommaso Arcidiacono, 87, Italy. Tel.: 39 (06) 5043441 - 5043442; fax: 39 (06) 5033071.

CANADA



April 18

Designing the Esthetic Occlusion and Cultivating Natural Esthetics in Winnipeg, Man. Presenter: Dr. Lloyd L. Miller. Contact Ms. Darcy Duggan, Continuing Dental

Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

May 1-2

15th Annual Meeting of the Academy of Sports Dentistry in Columbus, Ohio. Contact Dr. Frank Stechey, Suite 202, 151 York Blvd., Hamilton, ON L8R 3M2. Tel.: (905) 577-0770; fax: (905) 577-0721.

May 6

American Academy of the History of Dentistry in conjunction with the American Association of the History of Medicine will meet prior to the ODA/CDA Convention in Toronto, Ont. Contact Dr. Audrey Davis, 1214 Bolton St., Baltimore, Md. 21217. Tel.: (410) 728-4810; e-mail: mabdavis@earthlink.net

May 7

25th Reunion Dinner and Dance, University of Toronto Class of 1973 on Toronto Island, Ont. Contact Dr. Helen Johnston. Tel.: (416) 924-4695.

May 8

Reception for Dalhousie Alumni to be held in conjunction with the National ODA/CDA Convention in Toronto, Ont. Contact Jane Bolivar. Tel.: (902) 494-1674; fax: (902) 494-2527.

May 8-9

6th International Symposium on Facial Growth Guidance in Edmonton, Alta. Contact: Dr. Ben Eastwood, 1203 Baker Centre, 10025 106 St., Edmonton, AB T5J 1G4. Fax: (403) 425-2769.

May 30

Contemporary Restorative Materials and Cosmetic Dentistry in Winnipeg, Man. Presenter: Dr. Charles W. Wakefield. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

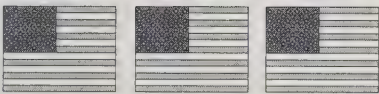
July 30 - August 1

Aesthetics '98 — International Symposium on Excellence in General Practice and Aesthetic Dentistry in Whistler, B.C. Contact Ms. Debbie Larocque, McGill University. Tel.: (514) 398-7203, ext. 4165; fax: (514) 398-8900. Or contact Ms. Olga Chodan. Tel.: (514) 398-7221.

October 2-3

Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632; fax: (519) 258-2637; e-mail: jberger@mnsi.net

U.S.A.



April 24-27

Star of the North Meeting in Saint Paul, Minn. Contact Ms. Dianne (Lutkevich) Blake, Minnesota Dental Association, 2236 Marshall Ave., Saint Paul, MN 55104. Tel.: (612) 646-7454.

April 30 - May 2

American Academy of Periodontology: Periodontal and Restorative Conference in Chicago, Ill. Contact Ms. Melodie Anderson. Tel.: (312) 573-3210; fax: (312) 573-3225; e-mail: melodie@perio.org

August 5-8

23rd American Academy of Esthetic Dentistry Annual Meeting: The Pursuit of Esthetic Excellence in Philadelphia, Pa. Contact AAED Headquarters, 1807 S. Washington St., Suite 106, Naperville, IL 60565. Tel.: (630) 355-0424; fax: (630) 355-0474.

DENTAL MEETINGS



May 7-9

ODA/CDA National Convention in Toronto, Ont. Contact Ms. Patricia Brennan. Tel.: (613) 523-1770, ext. 2246, or 1-800-267-6354; fax: (613) 523-3062.

May 23-27

27e Congrès annuel de l'Ordre des dentistes du Québec in Montréal, Que. Contact Dr. Denis Forest. Tel.: (514) 875-8511; fax: (514) 875-1561.

May 29-30

New Brunswick Dental Society Annual Meeting in St. Andrews, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; fax: (506) 452-1872.

June 4-6

Prince Edward Island Dental Association Annual Meeting in Woodstock. Contact Ms. Nettie Likely. Tel.: (902) 566-5199; fax: (902) 892-4470.

June 8-14

92nd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. Robert Mast. Tel.: (403) 346-7331; fax: (403) 342-0133.

June 12-13

Nova Scotia Dental Association Annual Meeting in Yarmouth, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; fax: (902) 423-6537.

June 18-20

Newfoundland Dental Association Annual Meeting in St. John's, Nfld. Contact Dr. Gary Butler. Tel.: (709) 368-1431; fax: (709) 364-1770.

June 18-20

Annual Scientific Session of the College of Dental Surgeons of Saskatchewan in Saskatoon, Sask. Contact Dr. Damara Rayner. Tel.: (306) 978-1700; fax: (306) 978-1732.

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News Update

Continued from page 173 ...

Errata

In the January 1998 issue of the *Journal*, in the article "Lateral Periodontal Cyst: A Case Report and Review of the Literature" by Drs. John P. Suljak, Richard N. Bohay, and George P. Wysocki (64:48-51, 1998), **Figs. 1a** and **1b** were cropped incorrectly. As a result, the lesion referred to in the photo captions was not shown. We are therefore reprinting the photographs, correctly cropped, in this issue. The *Journal* regrets the error. ■



Fig. 1a: Periapical radiograph of an LPC at the time of discovery. Note the characteristic location, shape, internal structure and effect on teeth.



Fig. 1b: Periapical radiograph of the same LPC 25 months later. Note the increase in size and the multilocular pattern at its inferior aspect. Also, note that the teeth have not been resorbed or displaced.

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Mr. Scott Smith
Manager, Human Resources
Grenfell Regional Health Services
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Tel. (709) 454-3333, ext. 349
Fax (709) 454-3171
E-mail humanresources@grhs.nf.ca

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D232

DEPARTMENT OF ORTHODONTICS FACULTY OF DENTISTRY UNIVERSITY OF TORONTO

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Toronto, ON M5G 1G6

For additional information regarding the position please contact: Dr. P. E. Rossouw, Head, Department of Orthodontics, tel. (416) 979-4924, ext. 4397 or e-mail to erossouw@dental.utoronto.ca

D233

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Posterior Composite Resin Simplification — What Of Scientific Validation?

William Liebenberg, BDS

Composite resin was originally introduced as a treatment modality for placing tooth-colored restorations in the anterior dentition. However, the material's esthetic and conservative allure led many dentists to prematurely extend its use to the posterior dentition.

As a result of our unfortunate failure to appreciate the need for technical diligence with these early direct materials, posterior composites became synonymous with posterior compromise.

Educators, who were quick to recognize that the favorable initial esthetic appearance of posterior composite resin restorations did not guarantee their long-term durability or quality, were slower to embrace this treatment modality. Many teaching institutions still believe that amalgam is the best direct material available for restorations in the posterior dentition.

In clinical practice, however, the enhanced performance of the newest resin formulations has begun to allay our reservations about placing direct tooth-colored restorations in the posterior dentition. The anxiety many dentists once had about recommending these materials to patients, which emanated from poor past experiences with outdated techniques, materials and operative skills, is fast disappearing.

Despite the growing confidence of practitioners, most refer-

red articles on posterior composite resin restorations include a daunting list of caveats for clinical success. These caveats include technique familiarity, near-ideal conditions, prudent selection of cases and strict attention to placement details.

Conversely, a number of articles in more commercial, non-refereed publications have advocated techniques that stretch the envelope of what were previously considered to be the outer limits of appropriate composite resin application. This insidious departure from the "recommended" procedures stems from our desire to satisfy the restorative needs of patients who request tooth-colored restorations, but cannot afford an optimum, indirect restoration.

The growing popularity of these "extended" techniques is a cause for concern. Essentially, our clinical methodology is being simplified without scientific validation. No one questions the need to develop techniques that will satisfy the complex variables of clinical practice, and allow posterior composite resin restorations to be used successfully with large lesions. Unfortunately, polymerization shrinkage and technique sensitivity are still significant problems. Although we may find it difficult to accept, the newest composite resins demand even finer assiduity than their predecessors

when it comes to restoring extensive posterior lesions.

This fact is being ignored in some quarters, however. Under the guise of an article describing "Advances in Restorative Dentistry," an unrefereed publication with a North American circulation of 140,000 recently highlighted a questionable "bulk-fill direct posterior composite technique."

In their introduction, the authors allude to the "perceived technique sensitivity in placing Class II resin," and describe a bulk placement technique that allows the clinician to place a posterior direct composite resin restoration in the same amount of time as it takes to complete an amalgam.

The scientific validation for the bulk filling approach rests on a well-researched study conducted at the University of Minnesota.¹ It successfully challenged the widely held belief that polymerization shrinkage is higher after bulk filling than it is when an incremental technique is used.

Although the deformation study makes for difficult reading (qualitative analysis using Poisson's ratio ν , volume-fraction f , etc.), it is founded in solid science (which passed intensive scrutiny during review). The study's conclusion is monitorial in tone, nevertheless, as the authors obviously recognized the potential for misappropriation in the

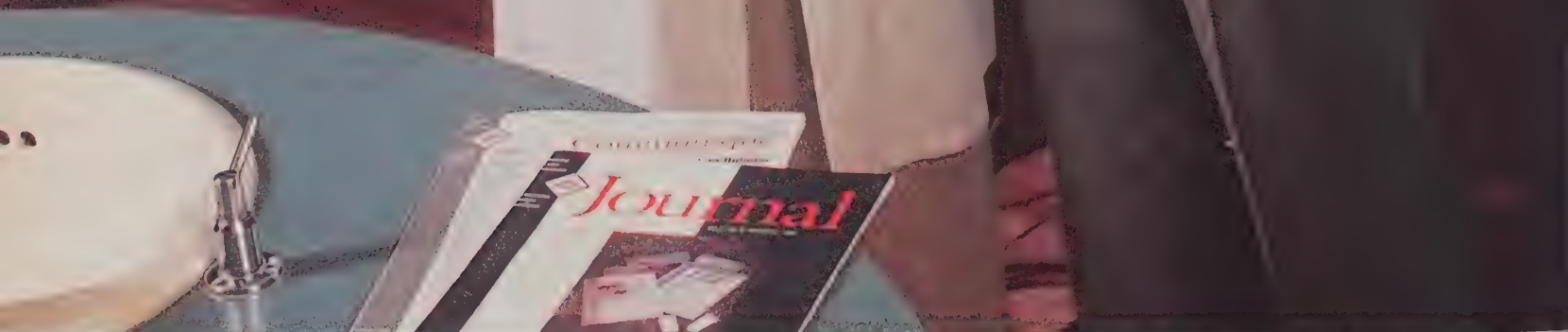
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clinical setting. They ultimately concede that "it is very difficult to prove" that reduced overall shrinkage stress is a valid reason to prefer incremental filling over single bulk filling, but suggest that there are other reasons to favor incremental filling over bulk placement.

In the unrefereed article, the authors describe a trans-enamel polymerization technique that relies on "light-cured composites shrink(ing) toward a light source." The technique appears to have some validity at first glance. However, in a soon to be published study, the Minnesota research group has reported the exact opposite effect.

This isn't surprising. Consensus in dentistry is usually only possible with a selective literary search. We read, report and act on information that sits comfortably with our current frame of reference (this author is similarly guilty). In reality, however, comfort zone therapeutics is severely self limiting. As educators, we need to make a

conscious effort to resist this type of biased process.

It is not my intent to besmirch the authors of the bulk fill technique. My only goal is to highlight the potential for simulated *in vitro* data to be inappropriately transferred to the clinical setting. At the same time, it should be noted that 140,000 clinicians have had access to the bulk fill treatment protocol, and only a fraction of them will ever be exposed to the contradictory information reported in the Minnesota research group's follow-up study.

Therein lies the ethics of information dissemination. Authors have to recognize the significance of their contribution and report on techniques in a responsible manner. This author, for one, looks forward to the day when bulk filling can be applied with confidence to the extensive cavity forms described in the article in question. For now and the foreseeable future, the direct composite resin restoration will continue to be a compromised option when it is used to repair extensive multisur-

face lesions in the posterior dentition. This option should therefore be reserved for patients who insist on tooth colored restorations, but are unable to afford optimum treatment with an indirect technique.

The pursuit for technique simplification should continue, but for now the quest for durability reigns supreme. Educators bear the responsibility to avoid confusion and tell it like it is. Direct posterior composite resin restorations require meticulous attention to detail — their complexity is not a perception, but a fact. Put simply, large posterior composite resin restorations are difficult. ■

Dr. William Liebenberg is the Journal's consulting editor in clinical dentistry. He maintains a private general practice in North Vancouver, British Columbia.

Reference

1. Versluis, A., Douglas, W., Cross, M. et al. Does an incremental filling technique reduce polymerization shrinkage stresses? *J Dent Res* 75:871-878, 1996.

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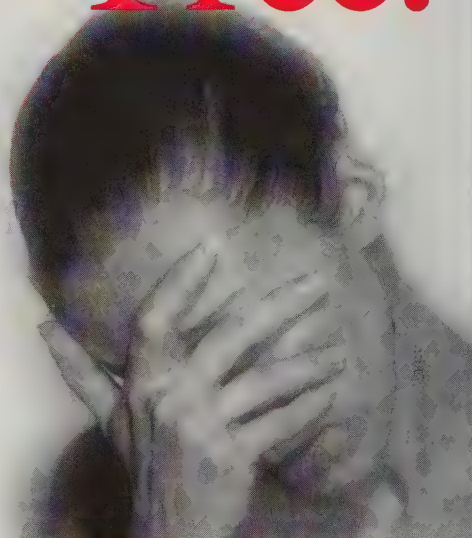
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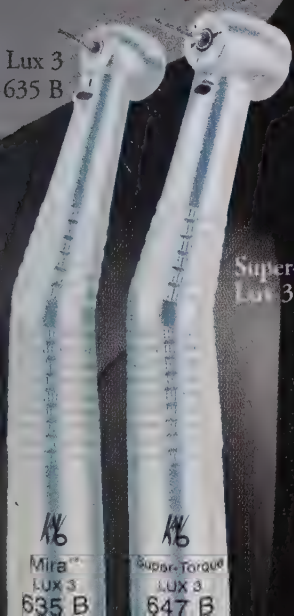
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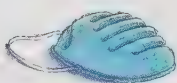
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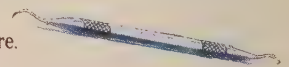


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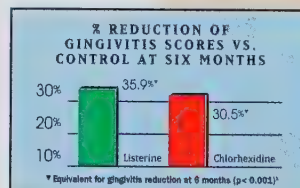
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[†] Gingivitis was evaluated using the Modified Gingival Index. ^{††} Warner-Lambert Company/Warner Wellcome Inc. use Scarborough, Ontario M1L 2N3.

¹ Overholser CD et al. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. *J Clin Periodontol* 1990;17:575-579. **PAAB**

² DePaola LG et al. Chemotherapeutic inhibition of supragingival dental plaque and gingivitis development. *J Clin Periodontol* 1989;16:311-315.

³ Data on file. 995

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Journal

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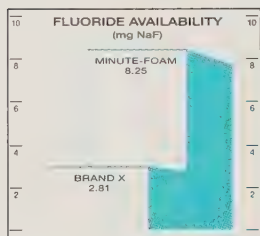
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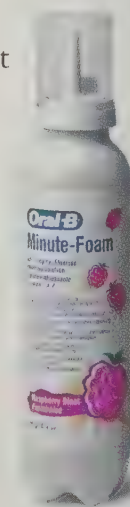
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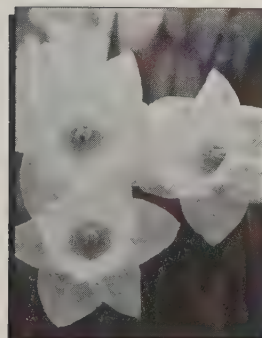
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Why I Won't Renew My CDA Membership

I read Dr. Jacinthe Larivée's letter, which was also published in the February edition of *Journal dentaire du Québec*, with a certain degree of incredulity (Larivée, J. Why I Won't Renew My CDA Membership. [Letters To the Editor] *J Can Dent Assoc* 64:159, 1998).

Although I can understand that Dr. Larivée doesn't share Ms. Francis' ideas (I myself don't agree with all that she says), I can assure you that CDA is not an "anti-francophone" organization. Quite the contrary. The people involved with CDA are "francophiles," if anything, and the relationship between CDA and the Quebec Dental Surgeons' Association (QDSA) has never been so healthy.

For the past few years, the relationship between CDA and dental organizations in Quebec has improved. Because of the goodwill of all concerned, we can boast that our profession has succeeded where the country's politicians have failed. When I was first elected to the board of CDA, I occasionally had to deal with certain preconceived notions. I came to realize that I had my own prejudices about the people I was working with. The beauty of the situation was that, over time, we learned to communicate and understand each other's point of view. In an ideal world we might all agree on everything, but perhaps life would be rather boring as a result.

Let's look at the evidence of CDA's collaboration with Quebec's dental organizations. Consider the bid to host an FDI World

Dental Congress in Montreal, last month's meeting between CDA and provincial licensing bodies (following a request from the Order of Dentists of Quebec (ODQ)) to discuss issues of common interest, the publication of the French edition of the *Journal*, the national effort to devise clinical practice guidelines, and the creation of a true national network for electronic data interchange (Dentaide/CDAnet), for example.

I have great difficulty understanding how a person could refuse to rejoin CDA simply because she did not agree with the selection of the keynote speaker for its annual convention. Ms. Francis certainly can be controversial, and her ideas are not shared by everyone, but she said nothing negative about Quebec during her address. I know, I was there in Calgary.

In our society, there are a multitude of subjects on which we may hold strong and differing opinions. Organizations such as CDA, QDSA and the ODQ must allow freedom of expression and tolerance. We live in a country where it is permissible to hold a strong opinion without fear of imprisonment or having your hand chopped off.

I don't agree with Ms. Francis' opinions about Quebec any more than Dr. Larivée, however, I believe that CDA, by virtue of its actions, scores more goals than it concedes.

The federal budget, in which Finance Minister Paul Martin extended the tax deduction on health and dental plans to self-employed, unincorporated Canadians, is a concrete example of what we can achieve for our profession when we work together.

Remember that just three years ago the federal government was ready to tax all dental benefit plan premiums. CDA launched a campaign in collaboration with all the provincial dental associations (Enough is Enough /Ça suffit, c'est assez) and today we have the pay off for that campaign. Not only did

we succeed in countering the government's proposed action, but we improved the situation.

My respect for someone is not contingent on us holding the same point of view. My instinct is to communicate with that person and present the logic of my position. Sometimes I succeed, other times I don't. All things considered, the advantages of communication outweigh the disadvantages.

That is why I will continue to be a member of QDSA, ODQ, CDA and FDI also. The people who are involved are devoted (I know what I am talking about) to their profession and to improving oral health. It is much better to try to change the opinions of people with whom you don't agree (remember there are always two sides to every story). Mounting the barricades only lends credence to peoples' prejudices.

Because I believe that liberty of expression and tolerance are fundamental aspects of our profession, I respect Dr. Larivée's decision not to rejoin CDA. However, I hope that the arguments I have laid out will convince Dr. Larivée to reconsider her decision to no longer support an association which works for and with us.

Louis Dubé, DDS
QDSA Councillor, Member of
CDA board of governors and
executive council
Sherbrooke, Que.

Health Profession Or Beauty Business: What Direction Is Dentistry Taking?

If the purpose of your February editorial was to initiate dialogue, you have succeeded (O'Keefe, J. Health Profession Or Beauty Business: What Direction Is Dentistry Taking? [Editorial] *J Can Dent Assoc* 64:75, 1998).

I consider myself, amongst other things, to be a cosmetic dentist. I have taken extensive continuing education courses in this field, and find it is the most



exciting and rewarding part of the practice of dentistry.

Today I saw a patient who had six anterior veneers placed three years ago by my partner. She emphatically told my new dental assistant, "It was the best thing I ever did!" This is a very sophisticated business person.

Both my partner and I do cosmetic mock-ups as part of our patient education or cosmetic consultation. I do not view this as hard sell or exploitation, if offered to a consenting and interested patient. What is wrong with showing a patient what can be done to improve the appearance of their smile?

If a person's self-esteem and confidence are raised by having an improved appearance, I feel this is a wonderful service. Why is an MOD amalgam or a root canal ethically OK, but improving a patient's feeling of self worth not professional?

Medicine has long since realized that health includes psychological and physical well being. Looking and feeling well are important. Dentistry should not be ashamed of jumping on the band wagon.

I am personally proud of helping to improve both the dental health and appearance of my patients. If a patient gets a better job, finds a new relationship, smiles more often, or just feels better about themselves, then I have offered a valuable service.

Many dentists offering cosmetic care are not unethical charlatans. We are caring practitioners who look after the health of our patients first and foremost, but are happy to educate them and offer all the wonderful benefits of today's dental technology.

Jocelyn Pearce, DDS
Toronto, Ont.

It is refreshing for an "old timer" like myself to read your editorial in the February issue of the *Journal* (O'Keefe, J. Health Profession Or Beauty Business: What Direction Is Dentistry Taking? [Editorial] *J Can Dent Assoc* 64:75, 1998). It is about time that leaders and true professionals in positions

of power and access to moulding opinion within the dental profession spoke out forcefully about the many areas of abuse and potential abuse that are creeping into the practice of dentistry.

Your editorial discussed the questionable methods of marketing "cosmetic dentistry." In the same issue of the *Journal*, CDA president Dr. Toby Gushue, while emphasizing continuing education, also questions the value of some of the material being offered by self appointed "educators" (Gushue, T. CE Spells Quality Dentistry. [President's Column] *J Can Dent Assoc* 64:77, 1998). One might also ask whether offering such courses as part of a cruise or in some distant exotic location really serves the purpose intended, or whether it is merely a legitimate excuse to enjoy a tax write-off while garnering points, rather than learning skills.

What about the increasing number of courses dealing with oral malodor prevention or elimination? And where do two-day courses on osseointegrated implants, that allow every Tom, Dick and Harry to place implants, fit in?

I am retired after nearly 45 years of practice, during which time the patient, not the bottom line, came first. In the winter months, I spend several weeks in Florida. What I see on television and read in the newspapers (both as reports and advertising) and hear from patients themselves is in many instances nothing less than a horror story.

When I was a dental student, the course on the history of dentistry labelled "Painless" Parker a charlatan and con artist. We were told that he was ejected from practice in every town and city in Canada where he sought to establish himself.

Today, I lecture on dental history, and still believe that these references are apt and true. Imagine my surprise when I heard Painless Parker hailed recently as a "pioneer in marketing and franchised dentistry in the United States," who made dentistry available to the masses!

Oh where oh where is my profession, which I want to remember with pride, headed?

Morton R. Lang B.Sc., DDS
Mount Royal, Que.

The TMD Controversies

I would like to respond to Dr. Burton H. Goldstein's guest editorial, "The TMD Controversies," published in the January 1998 issue of the *CDA Journal* (Goldstein, B.H. The TMD Controversies. [It's My Opinion] *J Can Dent Assoc* 64:65-66, 1998).

I want to congratulate Dr. Goldstein for helping to raise awareness of the unscientific and discredited practices used to treat and manage TMD in dental practice.

Facial pain is one of the most difficult subjects to diagnose in dentistry. TMD is considered to be one of the controversial causes of facial pain. This controversy involves its symptomology, etiology, classification, epidemiology, diagnosis, and treatment. Even its existence swells in controversy. In part, this is due to the absence of definitive objective diagnostic data, which led clinicians to follow more or less empirical treatment for TMD patients.

In the presence of such controversy, I think the clinician should direct his or her planned approach to a reversible means of treatment, and away from more invasive irreversible treatments ranging from costly unnecessary occlusal rehabilitation to TMJ implants, or even manipulation of the skull bones by opening the skull sutures to create ideal cranial bone relationships. I strongly share Dr. Goldstein's view that practitioners should continuously update and implement their knowledge, and abstain from any treatment that has been proven to be of dubious scientific value or treatments that are still in the experimental stage.

Authoritative bodies should attempt to clarify these issues, as well as laying the groundwork for eliminating the TMD controversy by proposing accepted scientific practices. I have been involved in the

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management of TMD patients since the early '80s, and have reflected my views during my academic career and my publications in the United States and the Middle East.

*Sahib M. Hussein, BDS, M.Sc.
London, Ont.*

Curing Light Price Hikes Unwelcome

On January 30, 1997, I bought a light bulb for my Eliper Visio curing light (by ESPE) for \$87.40. At the time I thought it was very expensive for a light bulb. Imagine my shock when I was charged \$187.80 for the same bulb on January 30, 1998 — a 115 per cent price increase in just one year. The reply I got from the dental supply company was "we don't know why." Is this another example of ripping off the dentists by dental manufacturers?

We dentists have limited our fee increases to one or two per cent in the past few years, and yet our dental supply costs have been sky rocketing. I wonder if there is a solution to this.

*Norman Ip, DMD
Winnipeg, Man.*

The CDA and Evidence-Based Care

The concept of evidence-based care has been addressed in a number of recent *Journal* articles. Brothwell,¹ by applying the rules of evidence to space maintainers, demonstrated that there is no scientific proof to justify their use. He emphasizes that once clinicians realize this fact they are capable of making informed rather than dogmatic decisions on the use of such devices. This is an excellent example of applying the principles and practices of evidence-based care to a common clinical situation.

In the same issue of the *Journal*, there is a news article regarding CDA's refusal to accept Health Canada's recommendations on mandatory hepatitis B testing and immunization for all health care workers (CDA Opposes Proposed HBV Recommendations. [News Update] *J Can Dent Assoc* 63:728,

1997). CDA could have justified its opposition based on a recent Health Canada report² showing "an encouraging picture of declining incidence of HBV infection in Canada in recent years," or an evidence-based position paper from the Society for Healthcare Epidemiology of America,³ which also does not support the Health Canada recommendation.

Instead, the CDA president⁴ states: "From a public health perspective, it is necessary to verify that a significant public health threat exists, and to identify measures to close the loop and prevent transmission of infection. In this instance, a comprehensive risk assessment has not been presented." This is a rational, even noble pronouncement, which satisfies the concepts governing evidence-based treatment. Unfortunately, it is one which CDA employs in an uneven, highly selective manner. A few examples will illustrate this opinion.

Barbeau and Nadeau⁵ recently presented a comprehensive, extensively referenced paper on the pathogenicity of dental unit water. Their conclusion, which agrees with other investigators, was that: "the question of health risks linked to the colonization of waterlines has not been adequately addressed by researchers."

Nevertheless, CDA has published an information bulletin that presents guidelines on the safe maintenance of dental unit waterlines.⁶ Not only is there a lack of evidence to support such an action, it is a direct contradiction of the philosophy espoused by the CDA president.⁴

Another example of this mixed message will be obvious to informed readers. In 1987, CDA developed a response to HIV infection and AIDS without having any evidence that a significant public health threat existed or that the measures taken to prevent that threat (if it was present) would be effective.

To further justify CDA's opposition to the Health Canada recommendations on hepatitis B, the

CDA president⁴ notes: "there have been no documented cases of transmission of hepatitis B by a dentist, in Canada or the United States, since 1986 when universal precautions were widely adopted." Dr. Gushue implies that this is evidence supporting the effectiveness of universal precautions. Such a conclusion is debatable, because it ignores the evidence that the transmission of hepatitis B in the health care environment, rather than being influenced by universal precautions, is related to the presence of the hepatitis Be antigen in the host,⁷ the duration of clinical practice of health care workers,⁸ and the use of hepatitis B immunization,⁹ which was introduced prior to universal precautions. CDA appears to have forgotten the confounding effect these factors have on any evidence linking hepatitis B transmission to universal precautions.

Perhaps the most blatant example of the inappropriate use of the evidence-based concept is CDA's continuing belief⁴ that its infection control recommendations are evidence-based. These CDA guidelines were introduced in 1987 and modified in 1991-1992. The irony is that the principles governing evidence-based care were not published until 1993.¹⁰ Indeed, the criteria governing the evidence-based nature of clinical guidelines developed by professional organizations such as CDA were not published until 1995.^{11,12} A careful analysis of these criteria reveals that while CDA's recommendations reflect expert opinion, they are not evidence-based. The issue is complicated further by the remarks of Jackson and Lynch,¹³ who insist that it is impossible to conduct the necessary studies to prove that infection control recommendations are evidence-based. Therefore, whenever it emphasizes the emphasis-based nature of its infection control policies, CDA is in a highly vulnerable position.

... Continued on page 308

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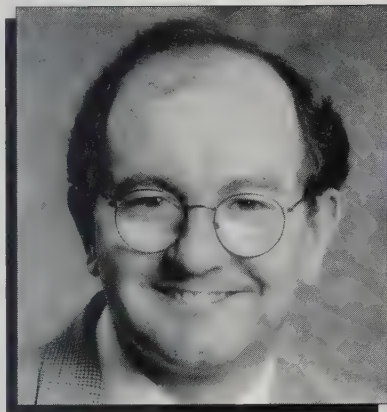
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EDITORIAL

A SPECIAL KIND OF WARMTH



Dr. John P. O'Keefe

At the end of January, I was in Winnipeg to attend a CDA executive council meeting.

Because the meeting coincided with the midwinter meeting of the Manitoba Dental Association, I had an opportunity to meet with numerous academics and practitioners during my visit, and received several excellent ideas for developing the *Journal* as a source of useful clinical information.

My first port of call was the University of Manitoba, where I gave a short presentation to members of the dental faculty about my vision for the *Journal*. My comments were followed by a lively discussion. One of the main points to emerge from this session was that academics seeking to see their material read by a broad readership would be more likely to submit to the *Journal* if it had a large circulation, similar to *JADA's*. My response was that the on-line version of our *Journal*, launched in March, will ultimately reach a very large international readership. Essentially, the key research, scientific, and clinical articles published in our *Journal* will now be circulated to every academic or clinician with access to the World Wide Web.

I also stressed that researchers and academics should consider

secondary publication in our *Journal*, by restructuring their manuscripts to meet the needs of Canadian general dental practitioners. While our *Journal* will continue to focus on publishing original articles, we must be prepared to present material that has been published elsewhere, especially if it will help Canadian dentists to be better practitioners.

I am very grateful to the group of approximately 20 faculty members who took time out of their busy schedules to come to my presentation, give me their opinions, and offer to help me with the *Journal*. During the coming year, I hope to visit each dental school in Canada to build a relationship with the educators, clinicians and researchers who are vital to the future of the *Journal*. The success of this publication depends on team effort, and the active involvement of people who care about it.

On my second day in Winnipeg, I attended a continuing education course on "Current Endodontic Concepts." Given by two local endodontists, Drs. Acheson and Peikoff, this well attended course provided a comprehensive overview of the cracked tooth syndrome and the current instrumentation used in endodontic therapy. The information presented was very practical and well received by the audience.

Clearly, dentists want to learn about clinical issues from colleagues who are respected in their areas of expertise. One of my main challenges in years ahead will be to solicit top quality clinical material of this type for the *Journal*.

I was amused by the course presenters who said they have a room in their office that is full of gadgets and instruments they never use. They bought these devices when they were first introduced, and subsequently found that they did not work as well as expected.

According to them, many of the publications that promote these types of gadgets and instruments mainly describe their advantages and scarcely mention their disadvantages. So I invite re-

searchers who evaluate dental materials, equipment and instruments to approach me with ideas for articles. I believe that many dentists find much of the available information on new products very misleading, and hope that publishing good evaluation articles in this *Journal* will help to reduce some of this confusion.

Talking to a general practitioner, I was told that, as a part-time staff member of a hospital, he makes regular case reports to other professionals. When I asked him if he ever published this work, he bashfully replied that he hadn't, and didn't feel that it would be worthy of publication.

I'm willing to bet that many practitioners, both specialists and generalists, possess a wealth of clinical information that could be published in our *Journal* as a case report, clinical review, basic practice tips column, or as an article describing strategies to overcome clinical problems. The difficulties that many practitioners face include: lack of time, shyness, and unfamiliarity with the publication process.

My message to my general dentist friend, and to the other practitioners I spoke to in Winnipeg was: please contact me with the outline of an article before writing a single word. I can advise you on how to develop an idea to the point where it is ready for submission as an article.

CDA also has a wonderful Resource Centre that can perform literature searches for members who wish to publish material. In short, we can help practitioners to share scientific and clinical information with colleagues.

It was great to see dentists meeting each other and enjoying themselves in Winnipeg. There was a real sense of community at the conference. My preconceptions about travelling to Winnipeg in January have been well and truly altered.

John P. O'Keefe, Editor
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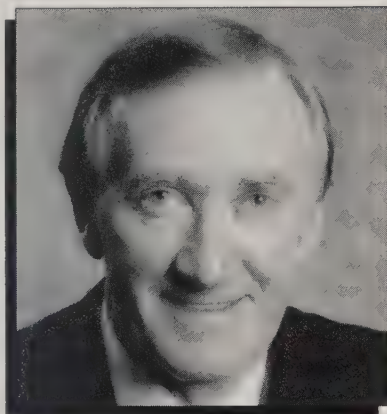
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PRESIDENT'S COLUMN

TAX VICTORY IS GOOD NEWS



Dr. Toby Gushue

When Finance Minister Paul Martin extended the tax deduction on health and dental plan premiums to self-employed, unincorporated Canadians and their families last month, CDA achieved a landmark victory on behalf of Canadian dentists and their patients.

After more than four years of intense effort, marked by the 1994 "Enough is Enough" campaign and the 1995 Mercer study, CDA, our corporate members, and individual dentists across Canada have virtually assured that employer-sponsored health and dental plan premiums will continue to be tax exempt during the Chrétien government's mandate.

Rather than eliminating the tax deduction on employer-sponsored health and dental plan premiums to create tax equity (and raise new tax revenues), as he seemed poised to do in his 1994-95 budget, Mr. Martin has apparently been won over to CDA's position that fairness can best be achieved by extending the deduction to as many Canadians as possible.

Dentistry's campaign to preserve the tax-exempt status of employer-sponsored health and dental plan premiums began in the Fall of 1993. Within two weeks of learning that it was in jeopardy, we had prepared a hard-hitting

brief supporting the deduction, initiated a public awareness campaign, placed an open letter to Canadians in the *Globe and Mail*, and launched a media blitz. The deduction was left intact in Mr. Martin's 1994 budget.

In mid-1994, when it became clear that the tax deduction issue was still on the table, we launched our "Enough is Enough" campaign. By the time it was over, more than 300,000 letters had been sent to Parliament Hill by Canadians opposed to the taxation of health and dental plan premiums.

Other key initiatives included CDA's first presentation to the House of Commons Standing Committee On Finance, a media conference, paid television advertisements, an updated brief on the tax issue, and face-to-face meetings with both Mr. Martin and the then minister of health, Diane Marleau. CDA also became a founding member of the Health Benefits Coalition, a strategic alliance of health associations and benefits industry stakeholders that was formed in 1995 to lobby against the taxation of dental plan premiums.

Mr. Martin never mentioned the tax issue in his 1995-96 budget. This was a mixed blessing for dentistry. Although the deduction was maintained, it was still very much on the table.

In October 1995, CDA launched an MP-Dentist Contact Program to take our no-tax message directly to Canada's 295 MPs. Along with our partners in the new Action Plan Committee For Fair and Supportable Tax Treatment, we also engaged William M. Mercer to research the tax issue. The end result was the Mercer study, which formed the basis of CDA's 1995 brief on the tax issue and our presentation to the Finance Committee.

We saw the tide begin to turn in January 1996, when the Finance Committee released its pre-budget report. Drawing on data from the Mercer Report, the committee advised the government to "examine the possibility of allowing self-employed, unincorporated individuals to deduct the premiums of supplementary health and dental coverage."

Although Mr. Martin did not act on the committee's recommendation in his 1996-97 budget, he once again maintained the tax exemption on employer-sponsored health and dental plan premiums.

In our 1996 and 1997 presentations to the Finance Committee, as well as in our briefs on the tax issue, CDA called on the government to extend the deduction on health and dental plan premiums to self-employed, unincorporated Canadians. The committee included our recommendation in both its 1996 and 1997 pre-budget reports.

With Mr. Martin's 1998-99 budget, and the extension of the deduction on health and dental plan premiums to self-employed, unincorporated Canadians, we can feel confident that the tax issue is finally off the table. Working together, we have been able to change the finance minister's position on tax equity and the value of dental plans.

This has been a significant achievement for CDA and its partners. Over the last four years, we have committed considerable time, effort and resources to the tax issue. Now we can sit back and savor our accomplishments.

Thanks to our efforts, approximately 1.5 million Canadians and their dependants will have an added incentive to visit their dentist on a regular basis.

I don't need to explain how important the continued viability of dental plans is to both our patients and ourselves. With Mr. Martin's 1998-99 budget, the vast majority of Canadians are now eligible for tax-exempt coverage through either private or government-sponsored dental plans. The end result will be increased busyness in our offices, and better oral health for all Canadians.

Last month I talked about the value of a CDA membership. CDA's leadership and efforts throughout the no-tax campaign will benefit every practising dentist for years to come. If we were to do nothing else for you, this accomplishment alone is worth many times the cost of our annual membership. That's value!

Toby Gushue, BA, BA (Ed.), DDS
President of the Canadian
Dental Association

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A Teamwork Approach

Burton Conrod, DDS

The basic strategy CDA has employed over the past two years to inform dentists, plan carriers, and the benefits industry about the drawbacks of managed dental care has served the profession well.

Our approach has involved sensitizing the profession, encouraging dentist-patient communication, and acting as a resource to plan administrators, brokers, benefits consultants and employers.

The fundamentals of CDA's campaign against managed dental care are contained in the strategic plan of CDA's steering committee on dental benefits issues (DBI committee), which gave rise to dentistry's 10 Guiding Principles On Dental Plans. It is also the basis for the key communications themes that CDA has used to create public awareness of managed dental care and promote the value of dentistry, including "be a partner in your oral health" and "your dental plan is not a treatment plan."

We have developed targeted communications vehicles, from fact sheets and in-office table placards to newspaper supplements to deliver our message to dentists and their patients. CDA's

Web site has been used to achieve the objectives identified in the three streams of action demanded by the DBI committee's strategic plan.

Our first objective was to sensitize the profession by informing dentists across Canada about the inherent pitfalls in the various types of managed care dental plans that were appearing in the Canadian marketplace. We had to achieve a buy-in on the managed dental care issue — and dentistry's response to it — not only from the provincial dental associations but also from individual dentists.

This phase of our strategy has been very successful. With the support and cooperation of our corporate members, particularly the Ontario Dental Association and the Quebec Dental Surgeons's Association, the fact sheets and other communications products CDA has distributed to dental offices across Canada have kept the profession well informed on managed care issues. The next step in this process will be to emphasize the importance of involving the entire dental team in the fight against managed dental care.

CDA may ultimately develop communications materials targeted directly toward dental office

staff, and encourage dentists to discuss benefits issues during their staff meetings.

For example, patients are unlikely to recognize the value of dentistry simply because their dentist refuses to accept the assignment of benefits. Unless the dentist makes his or her front office staff aware of the philosophy behind the practice payment policy, i.e. to ensure a positive dentist-patient relationship and encourage patients to be partners in their oral health, the desired message will not get through to the patients. Staff should be made aware that the financial burden to the patient can be eased by accepting postdated cheques or credit card payment, but that the ultimate goal is for the patient to appreciate the cost and value of dentistry and become more involved in treatment decisions.

In addition, staff members are the first to hear of upcoming plan changes from concerned patients. They should understand the importance of freedom of choice — and why dentistry stands behind this principle — and be prepared to advise patients to ask their employer to preserve their right to choose their own provider.

The dental hygienist, who is accustomed to explaining the necessity of preventive dental services, should also tell patients that dental plans are designed solely to assist them in paying for their dental care, and that not all necessary treatment will be covered by their dental plan.

In fact, the most important message that your staff can give to your patients is that they should have reasonable expectations when it comes to their dental benefits coverage. It may be easier to criticize the patient's dental plan when you're explaining why all the procedures proposed in a treatment plan are not covered, but it is also very counterproductive. Patients need to be informed that most plans do not cover the entire range of available dental services, from crown and bridge to orthodontics to cosmetic dentistry, and educated about the value of dentistry.

Everyone working in a dental office must constantly reinforce the value of dentistry theme, and the fact that preventive services are necessary to maintain or improve their patients' oral health. The message should be that preventive services are provided to reduce the risk of dental disease, which would result in the patient subsequently needing more extensive and expensive treatment, and not just because they are "covered" by the patient's plan.

When your staff are made aware of the importance of dental benefits issues, they will more readily distribute brochures and handouts, and engage patients in discussing them.

Many of CDA's information materials promote the message that "only your dentist has the training, skill and expertise to provide a comprehensive diagnosis about your oral health condition and to advise you on appropriate treatment and care." Once again, this message needs the support of

the entire dental team. The dentist must take the time to present treatment plans in a manner that encourages patients to make an informed choice. Patients must be aware that the dentist, and not the hygienist, is performing the examination and determining the diagnosis. Hygienists, assistants and receptionists need to promote the fact that the dentist is responsible for developing a treatment plan, in consultation with the patient, and that dental plans are not designed to anticipate everyone's treatment needs or how often they should visit their dentist for regular preventive care.

CDA also needs to share our views on managed dental care and our knowledge of dental benefits issues with the Canadian Dental Hygienists Association (CDHA) and the Canadian Dental Assistants Association (CDAA). We should encourage these associations to inform their members that some dental plans may restrict the ability of the dental team to provide optimal oral health care. To this end, a resource package is being developed for CDA's leaders to share with the leaders of CDHA and CDAA.

It is the dental profession's responsibility to ensure that the entire dental team recognizes the value of a dental benefit plan that respects dentistry's guiding principles, and incorporates acceptable cost containment measures. They must also recognize, and be prepared to discuss with patients, the negative health consequences of restrictive managed care plans that attempt to control treatment, affect the quality of treatment, or interfere in the dentist-patient relationship. ■

Dr. Burton Conrod is chair of the DBI committee, and a member of CDA's executive council. He maintains a general dentistry practice in Sydney, Nova Scotia.



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**CANADIAN DENTAL SERVICE PLANS INC.
(CDSPI) INVITES APPLICATIONS FOR
THE POSITION OF DIRECTOR ON THE CDSPI BOARD**

Qualifications:

- Must be a practicing licensed dentist, having been actively involved in practice for at least ten years
- Must be a member of the CDA and/or one of the Corporate Co-Sponsoring provinces.
- Must have served as a Board member, for at least five years, of a substantial organization but not limited to a role of a Board member in organized dentistry.
- Must demonstrate an understanding of the investment and insurance industry and a familiarity with major types of insurance and investment products offered by CDSPI.
- Must be willing to commit the time necessary to become an effective Board member. This appointment will be for a minimum three year term, with annual performance review.
- Having additional formal business qualifications at least at the undergraduate level, direct experience in the insurance and investment industry, or demonstrated sustained success in a business venture unrelated to dentistry would be an asset.

Starting Date:

- Successful applicants will be recommended at the 1998 CDSPI Annual Meeting on September 19th, 1998, in Ottawa and will attend an orientation session in Toronto prior to the first Board meeting in November 1998.

Compensation:

- The 1998 Compensation level is \$12,000 p.a. based on four meetings a year. The compensation is reviewed annually at the Annual Meeting.

Please submit a complete curriculum vitae accompanied by a letter expressing why you feel you can qualify for the role of Director and what contributions you feel you can make to the CDSPI Board by **May 9th, 1998**.

Please send your submission to:

Mr. Marvin Haggith
M.A. Haggith & Associates
5160 Yonge Street, Suite 810
North York, Ontario M2N 6L9
Fax: (416) 229-4710

NEWS UPDATE

Frequency Of Dental Office Visits Increases

The number of Canadians visiting the dentist is increasing and more patients are visiting their dentist at least once a year, a CDA survey has found.

A survey of 2,008 adults, conducted for CDA by Manifest Communications in November 1997, found that the proportion of Canadians who never visit the dentist declined from 19 per cent in 1996 to only nine per cent in 1997. The proportion of Canadians who visit the dentist at least once a year increased from 66 per cent to 74 per cent in the same period.

"This is good news for dentists," said Linda Teteruck, CDA's director of communications. "The survey results indicate that the demand for dental services is increasing. They also show that the dental awareness initiatives being undertaken by CDA and the provincial dental associations are bearing fruit."

CDA conducted a similar survey in October 1996. Although the 1997 survey was virtually identical to the 1996 version, it included several new questions to test the respondents' awareness of CDA. The 1997 survey also asked respondents if they recalled seeing CDA-produced advertisements, public awareness materials, or fact sheets in the previous six months.

"The results were very favorable," said Miss Teteruck. "Eighty-six per cent of respondents reported being aware of CDA, and 37 per cent recalled seeing, hearing or reading at least one of our messages. It is a good indication that the information we're communicating on the value of dentistry, and the importance of the dentist-patient relationship, is being received."

In fact, the survey found that 93 per cent of Canadians are satisfied with their dentist, and that



Spring Daffodils (35 mm Ektachrome II transparency)

Cover Photographer: Dr. Don Beauprie

Recently retired from active practice, Dr. Don Beauprie is a 1956 graduate of McGill University's dental faculty.

Dr. Beauprie was born and raised in Montreal. He moved to Deep River, Ontario, in 1956 to establish a general dental practice and enjoy the natural beauty of Algonquin Park.

Some of Dr. Beauprie's earliest photographs, taken with a "box" Brownie camera, were published in his high school annual. Later "and better" photographs appeared in McGill's year book, and a photograph taken at Fort Churchill, Manitoba, won first prize in an intercollegiate competition.

Dr. Beauprie's current interest is close-up photography, primarily of flowers but also of his four grandsons. One of his photographs recently won first prize, floral category, in the Federation of Ontario Naturalists' photo competition, and a landscape took top honors in the Friends of Algonquin Park contest.

"My recipe for photographic success is simple," said Dr. Beauprie. "A sturdy tripod, a Minolta X-700 loaded with Ektachrome II, and lots of patience — especially in black fly season."

Prior to the advent of in-office patient-education videos, Dr. Beauprie also used his photographic skills to create chairside slide presentations on several dental procedures, including endo, crown and bridge, and basic restorations.

A life member of CDA, Dr. Beauprie served in many capacities with the Renfrew County Dental Society, and is a past-chair of the Ontario Dental Association's professional development committee. ■

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most have had the same dentist for an average of 10 years. It also shows that 95 per cent of Canadians consider the skill and professionalism of their dentist to be "very important," and that 84 per cent believe that freedom of choice is important.

As was the case in 1996, however, 56 per cent of respondents said they would be somewhat or very likely to change dentists in order to maintain their dental coverage (i.e. if their dental plan carrier required them to choose a new dentist from a list of preferred providers). Forty-one per cent would not change dentists solely to maintain their dental coverage. ■

Worth Collection Finds New Home

A unique collection of oral radiographic material and hand-crafted glass slides assembled by the man known as the father of oral radiology has found a new home at The Hospital for Sick Children in Toronto.

The late Dr. Harry Worth's collection was donated to the hospital's dental department recently by Dr. Douglas Stoneman. It will be housed in a special office, and made available for study and research.

A 1919 graduate of Guy's Hospital dental and medical schools, Dr. Worth practised on Harley Street in London, England, before moving to Canada in the 1930s due to his deteriorating health.

Although Dr. Worth had planned to retire in Canada, the local climate suited him and his health soon improved.

At the outbreak of the Second World War, Dr. Worth volunteered his services to teach several three-month courses in basic medical radiology to army and air force medical officers. The courses were held at The Toronto General Hospital.

Following the war, Dr. Worth was named chief of radiology at Toronto's Wellesley Hospital. After practising for several years, he "retired" for a second time and moved to British Columbia.



Dr. Harry Worth

"He soon became associated with the dental faculties of the universities of British Columbia and Washington, and gave freely of his time to teach the important contribution of the radiologic input to diagnosis..." said Dr. Stoneman. "His unique teaching style enabled his students to learn the factual aspects of oral radiology along with the deductive reasoning necessary to suggest a radiographic diagnosis.

"It was Dr. Worth's opinion that oral radiology was a neglected discipline," added Dr. Sándor, a former student of Dr. Worth's. "He worked tirelessly to influence deans and other senior members of dental faculties to upgrade curricula and to attract qualified professorial faculty. He travelled widely throughout Canada and the United States, appearing at various scientific programs and participating in continuing education seminars at national, provincial and state levels. It has often been said that no matter where Dr. Worth hung his hat, he would begin to teach."

Dr. Worth passed away in the summer of 1987.

(Special thanks to **Dr. D.W. Stoneman**, a professor emeritus in the department of radiology, faculty of dentistry, at the University of Toronto, and a consultant oral radiologist to The Hospital for Sick Children and The Toronto Hospital, and to **Dr. G.K.B. Sándor**, the

coordinator of oral and maxillofacial surgical services at the Hospital for Sick Children and Bloorview MacMillan Centre, the acting head of the division of oral and maxillofacial surgery at The Toronto Hospital, and an assistant professor in the faculty of dentistry at the University of Toronto, for their contribution to this article.) ■

CDA Plans 1998 Public Awareness Campaign

CDA will launch a new public awareness program this spring.

Intended to promote dentist-patient communication and encourage patients to be partners in their oral health, the campaign will be based on a series of magazine advertisements and table placards.

CDA's "You and Your Dentist: Partners In Prevention" ad will appear in both *Maclean's* and *l'Actualité* magazines in April. Developed in 1997 to promote regular preventive and maintenance check-ups, the ad has been updated to reinforce the primacy of the dentist in the delivery of dental care.

In addition, CDA has reformatting its "A Healthy Smile Starts With A Healthy Dialogue" table placard as a magazine advertisement. The new ad, which encourages patients to talk to their dentist, will also appear in April to coincide with Dental Health Month.

The current campaign will also include CDA's 1997 "Be A Partner In Your Oral Health" ad, which will appear in the April issue of *Chatelaine* and its French-language equivalent, *Châtelaine*.

A second public awareness advertising campaign will be conducted in October, likely with a new series of ads designed to promote cost-effective fee-for-service dental plans.

CDA is also investigating the feasibility and cost effectiveness of making plexiglass holders available to dentists who wish to display the association's ads in their offices, and plans to develop a new in-office table placard. ■

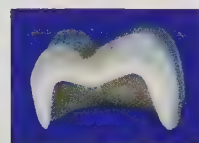


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Wagner WC, Chu TM; University of Michigan (JPD 1996; 76: 140-4)

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Keep Your Teeth For Life

A new oral health booklet has been published for Canadians with low literacy skills.

Developed by the Central Toronto Community Health Centres, *Keep Your Teeth For Life* provides illustrated oral health tips in clear, easy-to-understand language.

The 12-page booklet, which is available in both English and French, covers a wide range of oral health topics, from basic oral hygiene for adults and children; what to do about cold sores, bleeding gums and sensitive teeth; to smoking cessation and the availability of affordable dental care.

Keep Your Teeth For Life will be launched April 17, during Dental Health Month. Following the launch, 10,000 English and 2,500 French copies of the booklet will be distributed free-of-charge to Canadian organizations that serve individuals with low incomes and literacy skills, including public health departments, community health centres, prisons and mental health centres.

Dentists who treat patients with low incomes and literacy skills can purchase copies of the booklet for a minimal charge. For more information, contact Dr. Joel Rosenbloom at (416) 703-8481 or Ms. Karen Farmer at (306) 652-1049. ■

Appointments

QDSA Journal Appoints New Editor

The *Journal of the Quebec Dental Surgeons Association* (JQDSA) has a new editor-in-chief.

Dr. Paul Massicotte, a specialist in public health with the public health department of the Laurentians region of Quebec, was appointed editor of the publication earlier this year.

The founder of the Quebec Association of Dental Specialists in Community Health, Dr. Massicotte was also appointed as a negotiator. He is one of only a few Quebec dentists to have earned

specialty certification in dental public health.

Dr. Massicotte is involved in the development and management of public health programs in the province, and is a dental health awareness councillor. ■

MDA Installs New President

The Manitoba Dental Association (MDA) has a new leader.

Dr. Murray White of Winnipeg was installed as MDA president January 29 during the association's 114th annual meeting.



Dr. Murray White

A 1980 graduate of the University of Manitoba's dental faculty, Dr. White was elected to the MDA board in 1994 and was the association's vice-president in 1997-98. He has served on several committees for MDA, including its peer review committee, economics committee, ad hoc third party committee, cleft palate review committee and ethics committee.

Dr. White maintains a private general dental practice in Winnipeg, Man. He will be joined on the 1998 MDA board by: Dr. Phil Poon (Winnipeg), vice-president; Dr. Craig Fedorowich (Hamiota), past-president; Dr. Jean Bodnar (Winnipeg); Dr. Jim Bonar (Brandon); Dr. Babette Cohen (Winnipeg); Dr. Ron Monczka (The Pas); Ms. Armenia Evaristo, auxiliaries member; Mrs. Sylvia Moffat, appointee, minister of health. ■

LIBRARY PACKAGE

The CDA Library package for this month is on ODONTOGENIC CYSTS.

This package is available to CDA members for \$5 each, plus applicable taxes, and contains articles from current dental literature on this topic.

Consult the Members-Only side of CDA's Web site at <http://www.cda-adc.ca> to see a complete list of available packages. If you place your order through our Web site, you will receive the packages at half price!

1-800-267-6354, ext. 2223

Fax: (613) 523-6574

e-mail: library@cda-adc.ca

New Acquisitions:

The following items have been added to the Resource Centre collection this past month, and can be borrowed by members for \$5 each. Loan periods vary.

Books:

Dietschi, D. and Spreafico, R. *Adhesive metal-free restorations: current concepts for the esthetic treatment of posterior teeth*. Quintessence, 1997.

Malamed, S.F. *Handbook of local anesthesia*. 4th ed. Mosby, 1997.

Schleyer, T., Spallek, H., Spallek, G. *The global village of dentistry. Internet, intranet, online services for dental professionals*. Quintessence, 1998.

Terezhalmay, G.T. and Batizy, L.G. *Urgent care in the dental office*. Quintessence, 1997.

Videos:

The hard tissue laser: issues and applications

Direct resin veneers

The seating of porcelain veneers

Connective tissue grafting for root coverage

Gingivectomy and tissue recontouring

The preparation of porcelain veneers

Placement of posterior direct resin restorations Parts 1 and 2

The fundamentals of porcelain veneers

Placement of indirect resin restorations

Placement of anterior all-ceramic restorations

Esthetic inlays and onlays: simplified, predictable techniques

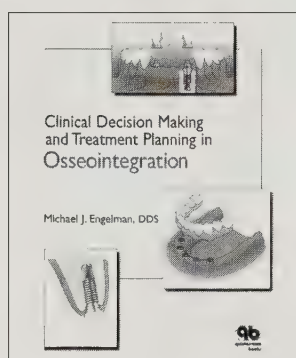
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BOOK REVIEWS

Clinical Decision Making and Treatment Planning In Osseointegration

by Michael J. Engleman, DDS
1996, Quintessence Publishing Co., Inc.
Carol Stream, Ill.; 219 pages;
Full color illustrations and photos
\$82 (US)
ISBN: 0-86715-318-0



This book describes the step-by-step clinical applications of osseointegration. Its initial chapters discuss the various stages in patient identification, education, economics, treatment planning and, ultimately, patient treatment. Specific chapters have been dedicated to the single missing tooth, partially edentulous considerations for the maxilla and mandible (anterior and posterior), and to maxillary and mandibular completely edentulous implant concepts.

The book's illustrations are formatted in a similar fashion to those used in Nobel Biocare's patient and dentist information literature. It is full of clinical scenarios outlining alternative treatment modalities that could be adapted to any patient. In all treatment scenarios, the advantages, disadvantages, and contraindications are discussed. The author also includes multiple application 'forms,' which are used in planning, communicating treatment to the patient, cost analysis for the patient and the practice, treatment planning, problem listing, and treatment sequencing. A number of user friendly prosthodontic flow charts are also presented, allowing the reader to easily determine the next stage or step in

treatment. This book is a must have for the novice/inexperienced implantologist.

The strength of the book lies in its detailed diagrammatic representation of every possible type of implant treatment and outcome. Diagrams are supported by high-quality color clinical photos. For those looking for an easy to read and use clinical implant reference book, this is an excellent choice. The simplistic approach used to describe the basic procedures and steps in implant therapy prepares the reader well for the more advanced concepts introduced in later chapters.

The author has produced an excellent compendium of all aspects of clinical implant therapy. This book can be highly recommended to those who have recently introduced implant dentistry to their practice or to the experienced clinician.

Reviewed by:

Ronald G. Ritsco, DMD, MS
Saskatoon, Sask.

Problem Solving In Endodontics; Prevention Identification and Management, 3rd Edition

by J.L. Gutmann, T.C. Dumsha, P.E. Lovdahl et al.

1997, Mosby-Year Book, Inc.
St-Louis; 365 pages with
black & white illustrations
\$123 (Cdn)
ISBN: 0-8151-4044-4

When the first edition of *Problem Solving In Endodontics* appeared in 1988, it was a small text of 164 pages that covered the discipline of endodontics in a unique manner.

Traditional texts usually break the subject into individual phases of treatment and then present ideals and examples to illustrate a method of treatment.

The problem solving concept, which was applied by the authors in a similar manner to the approach now being used by dental educators, has considerable merit. General practitioners, whether they realize

it or not, should also use this approach when treating a patient at chairside. The conscientious practitioner treating routine endodontic cases will find this text very interesting to read, and will be able to relate it to past or future cases of endodontic treatment and diagnosis.

Some may question whether the publication of a third edition of this book was justified. Certainly, it contains more information than the second edition, in more than twice the number of pages. In addition, other areas of concern that lend themselves to the application of the problem solving approach have been introduced.

The chapter that now leads the text, under the subject heading "Assessment of Success and Failure," was added to the second edition. I find the author's continued emphasis on seeking a solution to a biologic problem rather than relying on high-tech devices to be most commendable.

This third edition of the book has been further updated and rounded out, with a total of 13 chapters. The problem solving approach is used throughout. Each subject or chapter is introduced with a brief description. This is followed by a discussion of a number of clinical problems, which are referenced to radiographs and illustrations. Finally, a solution to the problem, and often a more detailed explanation of the subject than was introduced by the problem, are offered. References at the end of the chapter are selected and comprehensive enough if further reading is desired.

This book is highly recommended to the conscientious practitioner who is looking to eliminate errors of omission or commission in their endodontic treatment. In all cases, its authors advocate a process of careful analysis and judgment.

Reviewed by:

William H. Christie, DMD, MS,
FRCD(C)
Winnipeg, Man.

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* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

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Conception et Tracé Des Prothèses Partielles Amovibles

par Normand Brien, DDS, MSD

1996, Les Éditions Prosthodontie Enr.,
Brossard, Qué., 320 pages
85 \$ (Can)
ISBN : 2-9804-961-0-3

Comme un scénario de film, cet ouvrage est le fruit d'une idée originale et décrit les séquences opératoires d'un traitement comme une tranche de la vie. La complémentarité du texte et des figures, ainsi que les renvois fréquents d'un couvert à l'autre, permettent au lecteur de visualiser l'interaction de toutes les forces et conditions mises en cause, j'ajouterais même... de les sentir. Hier, les auteurs, malgré la pertinence de leurs propos, se parlaient en dictant. Aujourd'hui, Normand Brien dicte en parlant au lecteur, à l'étudiant, au dentiste.

Dès le premier chapitre, l'auteur veut mettre en priorité l'étape la plus importante en P.P.A., soit l'examen et l'évaluation du patient. Pour lui il s'agit de la base angulaire du traitement et il le signale en posant la question : Le patient est-il prêt à accepter ses prothèses avec l'intention de s'y adapter, même s'il en connaît les limites?

Pour responsabiliser le dentiste, l'auteur cherche à l'ac-

crocher dès le départ. En cinq pages, la question de l'examen du patient est entièrement couverte avec une présentation aérée, un texte concis. Les titres et sous-titres, l'agencement des paragraphes et des énumérations sont d'une attirante et éblouissante clarté. En un mot, les messages sont à la fois clairs et séduisants.

À l'intelligence et au raffinement du texte, il faut ajouter les beautés de la représentation graphique. Chaque page est tellement agréable à regarder, qu'avant de lire le premier mot, on est porté à tout regarder, à tout considérer, comme une table bien mise. C'est beau, ça plaît, l'auteur nous voulait; il nous a eus.

C'est au deuxième chapitre que le lecteur découvre l'éloquence des dessins. Mettre en priorité le concept de la rotation dès le début du livre, favoriser l'immersion du lecteur confronté à cet épineux problème, tout au long de l'ouvrage, l'auteur y reviendra constamment. En parlant des différents axes de rotation, l'auteur les considère comme le talon d'Achille de toute prothèse en extension. En mettant l'emphasis sur les différents axes de rotation, l'auteur parvient à illustrer subitement l'interaction des mouvements possibles sur toute prothèse en extension. Sous-jacent à tout cela, il y a cette interaction des axes de rotation et

l'infinité des états d'édentation partielle, si l'on tient compte de tous les facteurs mis en cause.

Ce bouquin constitue un instrument de travail pour tout dentiste s'adonnant à la prosthodontie partielle amovible. C'est pourquoi j'attire l'attention des lecteurs éventuels sur ce qui distingue particulièrement cette oeuvre :

- considérations parodontales;
- difficultés particulières (il y en a 58 apparaissant dans 10 des 19 chapitres);
- abondance de figures;
- les dessins (comme compléments aux photos);
- tracé et conception des appareils;
- document de communication entre le dentiste et le technicien dentaire.

Pour tout dire, finalement, il s'agit là d'un travail colossal, un véritable travail de moine. Un écrivain français, Edouard Boulat, a écrit récemment : *donner juste ce qu'il faut ce n'est pas donner.*

Compte rendu :

Jacques Fiset, DMD
Montréal (Québec)



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+ : Dosages suggested are for adults, with clinically severe (often life-threatening) infections. Dosages also assume normal renal function, and not severe hepatic dysfunction.

++ : Alternative therapy includes these considerations: allergy, pharmacology/pharmacodynamics, compliance, local resistance profiles.

+++ : AM/CL = amoxicillin/clavulanate

Adapted from Sanford 1996

*Penicillin, which was the antibiotic of choice for a long time, induces the production of β-lactamase by certain anaerobes, specifically *Bacteroides* species, and clinical failures have been increasingly reported in the literature.²

**In Canada, most *Bacteroides* species are resistant to Penicillin.³

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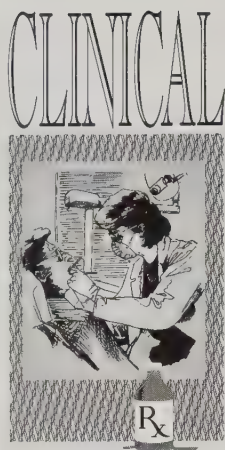
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Drug-induced Gingival Enlargements

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ABSTRACT

There are many types of gingival enlargements which vary according to the etiologic factors and pathologic processes that produce them. The most common drug-induced gingival enlargement is associated with Dilantin (phenytoin). Cyclosporin and calcium channel blockers, which are increasingly used for some cardiac diseases, immunosuppression and autoimmune disorders, also cause gingival enlargement. The term "gingival hyperplasia" is an inappropriate term because enlargement is not the result of an increase in the number of cells, but rather an increase in extracellular tissue volume. This paper presents a detailed description of various drug-induced gingival enlargements, including the clinical appearance, microscopic presentation, pathogenic mechanisms and treatment options.

Introduction

Drug-induced gingival enlargements have been noted since at least as early as 1939.¹ Drugs such as phenytoin, cyclosporin and calcium channel blocking agents alter gingival fibroblast metabolism. In conjunction with an existing gingival inflammation, these drugs cause gingival enlargement which can be problematic and disfigur-

ing. While the phenotypic appearance of the tissue is similar in all cases, a common mechanism is not yet apparent. This paper reviews the pathogenesis, clinical and histological features of a number of drug-induced gingival enlargements, and comments on treatment options.

PHT-induced Gingival Enlargement

Dihydantoin or phenytoin (PHT) is an anticonvulsant used by over two million people for the treatment of epilepsy and other convulsive disorders, neuralgias and some ventricular arrhythmias. It is associated with gingival enlargement in about 50 per cent of users,² but the percentage may be higher in younger or institutionalized patients³ with males having a higher prevalence than females.⁴ When enlargement occurs, it often appears two to three months after the beginning of treatment and reaches a maximum severity at 12 to 18 months.⁵ The occurrence and severity of the enlargement does not seem to correlate to the drug's dosage^{6,7} or the serum concentrations of the parent drug or its metabolite.⁸ PHT is highly bound to plasma proteins⁹ and its activity can be potentiated by interactions with drugs such as tolbutamide, chlorthalidopoxide, diazepam, estrogens, and disulfiram. These

drugs are also highly bound and can increase serum levels of phenytoin through enzyme binding interaction.⁹ PHT's anti-seizure action results from the stabilization of the neuronal cell membrane to calcium, potassium and sodium ions. This property also decreases the calcium influx into fibroblasts,¹⁰ and calcium is an important co-factor in many enzyme-mediated cellular activities.¹¹

Clinically, the initial enlargement begins with a bead-like interdental overgrowth which progresses to the marginal tissue, uniting the papillary enlargements (**Fig. 1**). Growth is slow, but in severe cases it can increase to the point of full-tooth coverage and may result in gross displacement of teeth.¹² The enlargement can interfere with occlusion and oral hygiene and may move erupted teeth or interfere with tooth eruption. Overgrowth is usually generalized, but it begins and is most severe around the anterior teeth. It has rarely been reported in edentulous and primary dentitions.¹³ Without secondary inflammation from gingivitis or periodontitis, the tissue appears mulberry-shaped, firm, pale pink, resilient, and has minimal tendency to bleed. These enlargements project from beneath the gingival margin which they are separated from by a linear

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groove.¹⁴ The absence or presence of local factors (plaque and calculus deposits) does not correlate directly with the presence of enlargements.¹⁵ However, local factors along with secondary inflammation can advance tissue growth, increase bleeding tendencies, change the gingival color to red or bluish-red, and obliterate the lobulated surface demarcations.¹⁴ Plaque control becomes increasingly difficult for patients with gingival pockets.

Microscopically, the stratified squamous epithelium shows acanthotic changes that are secondary to the enlargement of the connective tissue core. Elongation and extension of the rete pegs occurs into the expanded connective tissue which exhibits a dense arrangement of collagen bundles and fibroblasts, but no increase in the number of fibroblasts. There is an increase in the proportion of noncollagenous proteins from 11 per cent to 20 per cent which adds to the volume of enlarged connective tissue.^{16,17} There is also an increase in oxytalan fibre content which adds tensile strength to the connective tissue.¹⁸⁻²⁰ Inflammatory changes are commonly seen along the sulcular surfaces of the gingiva.¹⁸⁻²⁰ The fibronectin fibres in the submucosa appear to be of variable length and seem to penetrate the basement membrane.¹⁸ In addition, there is a doubling of the number of Langerhans cells in the epithelium.^{19,20}

A number of pathogenic mechanisms for PHT-induced enlargements have been postulated: a) PHT stimulates the mitotic activity of a subpopulation of fibroblasts which become the predominant cellular component.²¹ b) PHT can elicit a folic acid deficiency by reducing its absorption from the gastrointestinal tract or blocking its transport. This would cause degenerative changes in gingival sulcular epithelium and could allow the ingress of local pathogens since folic acid is necessary for DNA synthesis.²² c) PHT, or its metabolite 5-(parahydroxyphenyl)-5-phenylhydantoin which also induces gingival enlargement,⁷ can accumulate



Fig. 1: Dilantin-induced gingival enlargement.



Fig. 2: Nifedipine-induced gingival enlargement.



Fig. 3: Gingival enlargement in patient receiving verapamil and cyclosporin.

in dental plaque through the gingival crevicular fluid and affect gingival tissues locally as well as systemically.^{7,23} d) PHT can decrease the intracellular transport of calcium into fibroblasts and thus decrease the activity of the collagenase

enzyme degrading the extracellular collagen.¹¹ e) PHT can increase the synthesis of hydrophilic noncollagenous proteins and matrix, allowing water to bind to these sites and swell the gingival tissue.²⁴ f) PHT can increase macrophage

synthesis of platelet-derived growth factor which affects connective tissue growth and repair.²⁵

The initial treatment of PHT-induced overgrowth involves controlling local factors. If overgrowth is severe (e.g. >30 per cent crown coverage²⁶), surgical treatment by gingivectomy or CO₂ laser²⁷ is warranted. Alternative medications that have less enlargement potential, such as carbamazepine or valproic acid, should be substituted for PHT if medically feasible.

Cy A-induced Gingival Enlargement

Cyclosporin A (Cy A), a potent immunosuppressive discovered in 1972, is a cyclic polypeptide derived from the metabolites of two fungi: *Trichoderma polysporum* and *Cyclindrocarpon lucidum*.²⁸ The drug was developed for its antimicrobial possibilities, but was later shown to have a potent inhibitory effect on the cell-mediated immune system.²⁸ While Cy A is now mainly used to prevent graft rejection for patients undergoing transplants, it is also used for autoimmune disorders including inflammatory dermatoses, such as psoriasis and lichen planus, insulin-dependent diabetes, and systemic lupus erythematosus.²⁹ Cy A-induced gingival enlargement was first noted in the dental literature in 1983³⁰ and its incidence is now estimated to be around 27 per cent. It occurs more frequently in females (38 per cent) than males (17 per cent).³¹

While the clinical appearance and onset of Cy A-induced gingival overgrowth are similar to the PHT-induced enlargements, there are also some differences between them. The gingival tissues seem to be more hyperemic as compared to PHT-induced enlargements³² and the presence of local inflammatory factors has a greater tendency to aggravate and worsen the extent of gingival enlargement. Once the tissue enlargement has occurred, improving oral hygiene does not alter the tissue overgrowth even though it reduces the gingival inflammation.³³

Histologically, compared to PHT gingival enlargement, the collagen microstructure seems to consist of an irregular arrangement of bundles and the connective tissue looks highly vascularized.³⁰ The fibronectin fibres look longer and more parallel in distribution, and the connective tissue has many more acute inflammatory and plasma cells.¹⁸ In addition, the epithelium tends to appear more irregular, multilayered and parakeratinized, resulting in variable thickness.⁴ There has been some suggestion that changes in fibroblast cell density³⁴ and stimulation of DNA synthesis and cell proliferation³⁵ could occur as the lesion progresses. This would suggest an element of true cellular hyperplasia at some point in the maturation of the lesion.³⁴

Functionally heterogeneous subpopulations of fibroblasts are found in normal human gingival tissue and it is surmised that Cy A, like PHT, has a differential effect on these fibroblast subpopulations.³⁶ Thus certain fibroblasts may be stimulated to produce increased amounts of collagenous and noncollagenous proteins in the submucosa. Cy A also lowers free cytosolic calcium which can impair extracellular collagen degradation and increase noncollagenous secretions by fibroblasts.³⁷ Both Cy A and its metabolite OL17 seem to have fibroblast proliferation properties.³⁸

There is disagreement concerning gingival enlargement and its relation to Cy A dosage. One study found oral doses over 500 mg daily resulted in overgrowth, while doses below 300 mg did not, which implied that a threshold concentration is required for gingival enlargement.^{39,40} However, other studies suggest that Cy A enlargement, like PHT enlargement, is not dependent on dose or duration.⁴¹ Local inflammatory factors (e.g. the lipopolysaccharide of *F nucleatum*⁴²) worsen the severity of the overgrowth. In susceptible patients, overgrowth can also occur despite the absence of local factors.⁴³ Recent evidence has shown

that Cy A or its metabolites may exhibit a local influence on the amount of gingival enlargement, since measurable concentrations have been quantified by monoclonal antibodies.⁴⁴

Cy A is increasingly used for the treatment of a number of diseases with an autoimmune component. Examples are type I diabetes, lichen planus, Bechet's syndrome, pemphigus vulgaris, rheumatoid arthritis and multiple sclerosis,⁴⁰ as well as rarer disorders such as Wiskott-Aldrich syndrome.⁴⁵ Younger patients with type I diabetes who take Cy A seem to experience more intense gingival enlargement than older patients.³⁶ It has been suggested that fluctuant levels of androgens and estrogens, to which fibroblasts are also sensitive, may compound the effects of Cy A.³² In addition, younger patients may have a higher rate of fibroblastic proliferation which can also generate connective tissue matrix products at a faster rate.⁴⁶ Concurrent usage of cimetidine, ketoconazole and amphotericin B increases the activity of Cy A by decreasing its hepatic metabolism.³² Cy A has a narrow therapeutic dose profile and, in addition to gingival enlargement, its side effects may include nephrotoxicity, hepatotoxicity, lymphomas, hypertension and hirsutism.³³

CCB-induced Gingival Enlargements

Calcium channel blockers (CCBs), which slow the displacement of calcium ions through the active channels of cell membranes, are categorized into three groups: a) dihydropyridines blockers (e.g. nifedipine), b) benzeneacetonitrile blockers (e.g. verapamil) and, c) benzothiazepine blockers (e.g. diltizem). Each family of drug differs in its site of action and thus each has a variety of therapeutic effects and clinical indications for use.³²

Nifedipine is the most commonly prescribed CCB because of its low dosage, efficacy and once-a-day regimen. It is used to treat acute and chronic coronary insufficiency

disorders such as angina pectoris and refractory hypertension.³² As a calcium channel blocker, it inhibits the influx of Ca^{++} into cardiac and smooth muscle cells without affecting the serum Ca^{++} concentration, thus preventing muscle contraction. As a result, calcium-dependent processes are impaired, such as the release of active collagenase into the extracellular fluid, thus reducing collagen breakdown.⁴⁷

Nifedipine-induced gingival enlargement was first noted in 1984 but, unlike with PHT and Cy A, it has never been reported in edentulous areas.⁴⁸⁻⁵⁰ As with PHT and Cy A, the enlargement begins within months of drug therapy and seems unrelated to drug dosages or plaque scores. The enlargement occurs gradually and seems to be more friable than PHT- or Cy A-induced enlargements. It has been suggested that these gingival enlargements may be totally reversed by controlling local factors alone.⁵² A case of nifedipine-induced gingival enlargement is shown in **Fig. 2**.

Histologically, the gingival epithelium is parakeratinized and the rete ridges are elongated. The underlying submucosa is composed of a myxomatous density of collagen, and the main inflammatory infiltrate is composed of varying quantities of amorphous ground substance, plasma cells and lymphocytes.⁵¹ Vasodilation and vascularization is greater than in the previously described enlargements.⁵³ Under a scanning electron microscope, the fibronectin has been described as more "microfibrillar" and cloud-like.⁵³

Other dihydropyridine CCBs also initiate gingival enlargement. Amlodipine is used to treat angina and hypertension. Although it is administered in dosages of five to 10 mg/day (the nifedipine dosage is 50 to 90 mg/day),⁵⁴ the prevalence of gingival enlargement is still about 20 to 30 per cent.⁵⁰ Compared to PHT, Cy A or nifedipine, amlodipine has a higher volume of distribution and a longer half-life, which may account for the 200-fold increase in gingival crevicular concentration

compared to plasma concentration.⁵⁴ This increased concentration may account for the gingival enlargement. Histologically, the collagenous stroma appears loose and filled with plump active fibroblasts with lots of ground substance. The overlying epithelium shows acantholytic changes.

Felodipine, used to treat arterial hypertension, also results in gingival enlargement. Histologically, more glycosaminoglycans are noted in the extracellular substance than with nifedipine. Water binding to these molecules is thought to be a factor in gingival enlargement.⁵⁵ In animal studies, nitrendipine resulted in gingival enlargement within two months of usage. The connective tissue shows an increase in vascularity and a loose matrix.⁵⁶ Oxodipine causes a dose-dependent, purely fibroblastic proliferation without any inflammatory cell infiltrate.⁵⁷

An example of the second group of CCBs is verapamil, a newer CCB that decreases myocardial contractility and acts on the sinus and atrioventricular node. It is used for supraventricular tachycardia and arrhythmias, especially in children, as well as for angina and essential hypertension.⁵⁸ Its action is slower than that of nifedipine and this is thought to explain the lower prevalence of gingival overgrowth (4.0 per cent) that is associated with it.⁵⁹ Low therapeutic doses (<100 g/L) do not result in gingival enlargement. However, higher dosages (100 to 600 g/L) do cause enlargement (**Fig. 3**), one which often begins in the maxillary and mandibular anterior interdental areas. This again implies that a minimal threshold is required.⁵⁸ Histologically, increased extracellular ground substance and more fibroblasts containing sulphated mucopolysaccharides as secretory granules are seen.⁵⁸ Treatment involves controlling local factors, followed by surgery if necessary.

Diltiazem is representative of the third family of CCBs, and only case reports of associated gingival enlargement are noted in the literature.^{60,61} Histologically, nifedipine-

ine- and diltiazem-induced enlargements appear similar under a scanning electron microscope.

The combination of nifedipine and Cy A is often used, since nifedipine reduces the hypertension and nephrotoxicity of Cy A. The concurrent use of these drugs results in a higher incidence (48 per cent) and greater severity of gingival enlargement than either used alone.⁶² The effect is not synergistic but rather additive.⁴³

Conclusion

Drug-induced gingival enlargements may manifest themselves in patients taking therapeutic dosages of dilantin, cyclosporin and calcium channel blockers. The clinical appearance of the enlargement is similar in most cases, although a common mechanism of action for gingival enlargement has yet to be proven. ■

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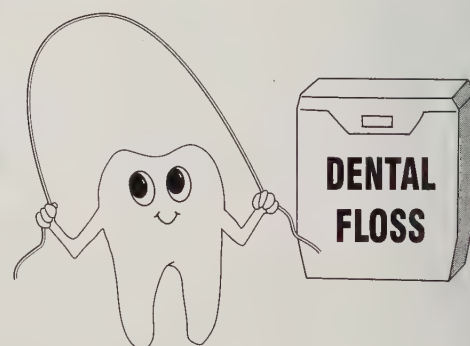
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Scaling and Root Planing: Hand Versus Power-driven Instruments

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ABSTRACT

Scaling and root planing (S&RP) are regarded as the main modalities for treating periodontal disease. The goal of these treatments is to arrest the disease process, maintain a healthy periodontium and preserve the dentition. As prevention becomes a larger component of everyday dental practice, dentists are performing S&RP more often as part of their periodontal maintenance programs. Therefore, it is essential for dentists to know the latest S&RP techniques and methods. This paper reviews the current knowledge and experiences related to mechanical non-surgical periodontal therapy and focuses on the types of S&RP instruments that are available, their advantages and disadvantages, their efficacy in debridement, and their effects on the hard tissues of the oral cavity.

Introduction

Mechanical therapy has always been the prime mode of treatment in the management of periodontal disease. This involves the thorough removal of supra- and subgingival plaque and calculus from the surfaces of all teeth using various types of scalers and curettes, either surgically or non-surgically. Regardless of the type of instrumentation or technique used, the main

objectives of this treatment are to halt the disease process, resolve inflammation, achieve patient comfort, and maintain or even regenerate the remaining periodontium.

Many clinical trials have shown that scaling and root planing (S&RP) can effectively treat periodontitis.¹⁻⁹ Other studies have concluded that regardless of the type of non-surgical (closed) instrumentation used, the effectiveness of S&RP decreases as probing depth increases.¹⁰⁻¹⁶ For example, Caffesse and co-workers showed that whereas roots in pockets of 4.0 to 6.0 mm in depth were only 43 per cent clean and those in pockets deeper than 6.0 mm were 32 per cent clean, root surfaces in pockets of 1.0 to 3.0 mm in depth were 83 per cent clean.¹²

Access and Non-surgical Versus Surgical Instrumentation

Whether hand curettes, ultrasonic or sonic instruments are used in S&RP, pockets exceeding 5.0 mm present a challenge to the clinician because of decreased accessibility and visibility. Therefore, with advanced periodontitis, surgical instrumentation is indicated. Additional factors that may indicate surgery include the anatomy of the roots (such as mesial concavities and furcations) and tooth positioning (as in cases of

crowding and tipping). Recently introduced fibre-optic illumination reportedly facilitates access for root instrumentation in deep pockets, thereby improving debridement, particularly in a non-surgical approach.¹³

Improvement In Clinical Parameters After S&RP

After S&RP, the pocket depth — an important clinical parameter — decreases as a result of two factors: gingival recession and tighter adherence of junctional epithelium to the root surface. Various studies have reported that the decrease in pocket depth and increase in attachment after instrumentation was best demonstrated at sites with deeper pockets.^{1-4,6-9,28,29,34,63,64} Furthermore, Badersten et al showed that gingival recession was greatest interproximally.^{28,29} After three weeks of S&RP, the average decrease in pocket depth was between 1.0 and 3.0 mm. Gingival and bleeding indices, usually recorded after four to six weeks of instrumentation, were also shown to improve with S&RP.^{4,63,65-68} Many studies, by Egelberg and co-workers as well as other groups, have demonstrated that controlling supragingival plaque alone does not achieve clinical improvements similar to those that result from professional S&RP, particularly

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in terms of clinical attachment.^{11,12,31,47,48,63,71,75,79,80}

Improvement In Microbiologic Parameters After S&RP

S&RP have been shown to cause dramatic shifts in the subgingival microflora. These shifts involve a decrease in gram-negative bacteria and an increase in gram-positive rods and coccal species, both of which are consistent with periodontal health.^{65-67,69-75,78} Spirochetes, motile forms and *Bacteroides* species are all reduced. Data regarding *Actinobacillus actinomycetemcomitans* (Aa) species are inconsistent, however. One group reported that there was a significant decrease in Aa counts after S&RP.⁸³ Others showed that Aa species persisted after deep instrumentation.^{57,77,84} It has been suggested, therefore, that the persistence of these species post-instrumentation may be associated with the failure of periodontal therapy and any obstinate forms of periodontitis. This also suggests that Aa species may be tissue invasive and thus systemic or localized antibiotics are required as an adjunct to mechanical therapy.

Cementum Removal In Root Debridement

Until recently, the removal of a substantial layer of cementum in S&RP was the ultimate goal for a comprehensive mechanical therapy.^{36,37} This trend started in the early 70s when it was found that a layer of cytotoxic products, mainly endotoxin lipopolysaccharide (LPS) from gram-negative bacteria, adhered to root surfaces.^{38,55} Because the level of LPS in diseased cementum is 100 or more times greater than that found in healthy cementum, it was concluded that all cementum exposed to the pocket had to be removed completely in order to achieve a biologically compatible or acceptable surface for clinical reattachment.^{36,39} This concept was reinforced in the early 80s when it was shown that none of the mechanical therapy instruments, hand or power-driven, could completely remove plaque and calculus.^{9,28,29,34}

In the past few years, the excessive removal of cementum has gradually been replaced by a more conservative management of root surfaces. This change has been made in response to the increasing evidence that endotoxins adhere weakly to root surfaces and do not penetrate deeply into cementum.^{40,41} Furthermore, it has been shown that fibroblast colonization and reattachment to root surfaces is not related to the amount of LPS found in cementum.^{42,44}

It is hard to assess whether diseased cementum has been removed completely. It also appears that it is not necessary to completely remove the diseased cementum to obtain a gain in clinical attachment.⁴⁴ Thus, the following question arises: which type of instrumentation is more effective and less damaging in root debridement, hand or power-driven scalers?

Hand Versus Power-driven Instruments

The use of hand versus power-driven scalers in mechanical therapy has been a controversial topic in periodontics. One only has to quickly look through a few current journals in periodontology to realize the wealth of literature comparing ultrasonic, sonic, and hand instruments. The two criteria addressed most frequently in these studies are the effectiveness in root debridement and the extent of overinstrumentation.

The abundance and controversial nature of these reports can be attributed in part to the variety of experimental designs employed, the different measuring devices and criteria used, and clinician/operator variation. Readers should therefore be very careful in interpreting the results of these studies.

It is important for dental practitioners to recognize and differentiate between the two basic types of studies that are commonly used in periodontal clinical research: longitudinal *in vivo* studies, and *in vitro* controlled experiments. *In vivo* studies are most valuable in terms of providing a better measure of the biological response of

tissues to periodontal mechanical therapy. This response is an indicator of the effectiveness of root debridement techniques.^{5,29,31,84,85} However, in these types of studies it is almost impossible to assess the iatrogenic effects of S&RP on dental hard tissue surfaces without extracting the teeth. This, by itself, would present an ethical dilemma if the teeth under study were not expected to be extracted. Therefore, many studies measure overinstrumentation of mechanical therapy on periodontally hopeless teeth for which extraction is planned, or on teeth that have already been extracted.¹⁷⁻²⁴

Current Experimental Designs Used In the Evaluation Of S&RP

In a practical or clinical setting, the evaluation of subgingival calculus removal and gross damage to root surfaces is determined by tactile sensation. This technique is not sensitive enough to produce the quantitative information needed to compare hand and power-driven scalers in root instrumentation. However, various *in vitro* methods can be used to evaluate the level of overinstrumentation as well as the efficacy of debridement for the different types of instruments used in mechanical therapy.

Histological examination of ground sections of stained teeth treated *in vitro* is one of the earlier methods used to measure overinstrumentation.^{19,53,62} For example, Dragoo used 4X magnification to test for instrument efficiency and root roughness.²⁴ He measured the length (in millimeters) of the root surface that was free from debris, and any gouges and scratches between the free gingival margin (inscribed on the tooth before extraction) and attachment level (determined by staining). Eschler and Rapley used 10X magnification to examine teeth.¹⁷ Their assessment and scoring involved two methods. In the first, a grid was fitted onto the microscope lens to divide the field of examination, and squares with debris and/or gouges and scratches were recorded appropriately. The second method of

analysis used a digitizing tablet system in a computer program which allowed the operator to trace a figure (debris or overinstrumentation marks), outline its perimeter and give its precise area. The authors' most important conclusion was that the old grid-square method of analysis produced figures two to eight times greater than the digitizing tablet system method, which seemed to indicate that "the outlook for effective root instrumentation may not be as pessimistic as previously reported."¹⁷ Another variation of these methods couples scanning electron microscopy with visual examination of stained remaining debris and root smoothness, and uses specific criteria in the form of indices.^{23,25-27} A further method, introduced more recently, uses a profilometer that reproducibly measures instrumented root surface levels at the same location. To accomplish this, a bench-vise is used to position the teeth which are embedded in plaster.^{18,21}

Current *in vitro* techniques offer well-defined baselines from which measurements can be made. In addition, forces applied in S&RP are more controlled or at least measurable. However, these techniques may be criticized as not being true representatives of clinical situations where forces applied by operators are not constant in magnitude or direction.

Technical and Clinical Considerations Of the Different Types Of S&RP Instruments

In all of the above-mentioned experimental designs, there are important technical differences that should be kept in mind when considering the various types of scalers used in mechanical therapy. For example, force of stroke and tooth material loss are linear when using hand curettes and nonlinear when using motor-driven scalers. Sonic scalers vibrate between 2,000 and 6,000 cycles/second and have normal working frequencies of 18 kHz. Ultrasonic scalers vibrate between 20,000 and 40,000 cycles/second and have normal

Table I

Advantages and Disadvantages Of Power-driven Instruments

Advantages:

- Less operator fatigue
- Less time consuming
- Removes stain better
- Useful for heavy supragingival calculus and deposits
- Cleans and debrides the field of operation with irrigation effect
- More effective in anatomically difficult areas such as furcations
- Wider selection of size and shape of the newer tips
- Effect of cavitation on plaque
- Less soft tissue distension with slimmer tips

Disadvantages:

- Aerosol spray contraindicates its use with AIDS patients and carriers of other transmissible diseases
- Noisy
- Root sensitivity is common
- Loss of tactile sensation
- Ultrasonics are contraindicated with cardiac pacemakers

working frequencies of 25 kHz. Ultrasonic tips vibrate in a plane parallel to the long axis of the instrument and thus to the surface of the root. Sonic tips oscillate in an elliptical motion at right angles to the surface of the root. Ultrasonic tips are more rounded in cross section than sonic tips, thus providing a greater contact area with the root surface and, theoretically, a lower energy density which removes less root surface.

Clinically, the loss of root substance depends not only on the shape and mode of action of the scaler's tip, but also on the force applied by the operator. Therefore, hand scalers tend to be more controllable than power-driven scalers and have less tendency to cause iatrogenic damage to root surfaces. However, the sharpness of the cutting edge and the angulation of the instrument are both critical factors in determining the efficacy of root instrumentation.

For power-driven instruments, the speed and frequency settings are important technical and clinical factors. The higher the speed and frequency, the more tooth

structure is removed or lost. Therefore, it is more likely that power-driven scalers cause overinstrumentation, particularly in the hands of an inexperienced operator. Nevertheless, they have some desirable features over hand scalers, especially in today's practice setting. They may produce less fatigue in the operator and shorter treatment time for the patient.

The advantages and disadvantages of sonic and ultrasonic scalers are summarized in **Table I**.

Highlights From the Current Literature On Comparative Studies Of Hand and Power-driven Instruments

The number of techniques and methods currently used to evaluate root debridement and overinstrumentation vary as much as the mode of action and instrument types themselves. Nevertheless, while there is agreement that all instruments used in mechanical therapy improve clinical parameters such as pocket depth, bleeding and plaque indices,^{14,15,28-33} not all of them accomplish complete plaque and calculus removal.^{9,28,29,34} While some research data indicate



that ultrasonic debridement was less effective and produced rougher surfaces than conventional S&RP,^{18,25,26} other data showed the exact opposite.^{23,30} Furthermore, some studies indicated that clinical responses to both ultrasonic and hand scalers were identical.^{28,29,33,43}

When comparing sonic and ultrasonic scalers, Egelberg and co-workers found them to be equivalent with respect to clinical tissue response after instrumentation.^{5,29,31} However, Lie and Leknes found that sonic scalers produced smoother surfaces and removed calculus more efficiently.³⁵ Jotikasthira et al, confirmed that sonic scalers were more efficient but added that they were more damaging to root surfaces than ultrasonic scalers.²³ With these findings in mind, it becomes more apparent and easier to understand why there is such controversy in the literature regarding the efficiency and iatrogenic effects of the different types of scalers available to clinicians.

New Ultrasonic Modified Inserts

A recent study tested the newly modified inserts used with ultrasonic scalers and found them to be superior to the unmodified conventional inserts of both ultrasonic and sonic scalers.²⁴ Today, more and more clinicians are using these modified inserts and achieving successful results. This new method is easy to learn, very efficient, saves time and removes the least amount of root structure as compared with all other scalers. It is expected that these new modified tips will improve S&RP.^{24,54}

S&RP With Other Types Of Root Instruments

In S&RP there are instruments other than scalers which have proven their role in particular situations. Rotating instruments used in S&RP involve fine-grained diamonds mounted on slow- or high-speed air turbine handpieces. During surgical procedures their use is indicated in difficult access areas such as root concavities, deep narrow pockets and

furcations.⁶¹ These types of instruments have been shown to be more effective than other ultrasonic scalers and hand curettes *in vitro*.²⁷ However, Ritz et al reported that these instruments contributed to the greatest loss of root substance when compared to hand, sonic, and ultrasonic scalers.¹⁸ For this reason, they are not commonly used for S&RP.

S&RP Of Furcation Areas

Comparative studies of hand and ultrasonic scalers in Class II and III furcations showed that ultrasonic instrumentation was more effective in altering plaque composition. Specifically, ultrasonic instrumentation was found to reduce the levels of motile rods and spirochetes.^{49,50,81} In addition, studies have confirmed that surgical access improved furcation debridement as compared to a non-surgical approach.^{58,59} The size of the instrument tip, the ultrasonic vibrations, and the furcal architecture were suggested as the reasons for this difference. As a result, new ultrasonic scalers have been designed specifically for furcations. They have a 0.8 mm spherical tip, operate at a frequency of 30,000 Hz, and have been shown to be superior to earlier ultrasonic tips.⁶⁰

Root Surface Roughness With Different S&RP Instrumentation

Ultrasonic scalers usually leave rougher surfaces than hand instruments.^{25,51} This roughness was not shown to be significant in terms of the gain in clinical attachment.^{52,53} As mentioned earlier, when using motor-driven scalers, the intensity setting and exposure time are critical to avoiding overinstrumentation of root surfaces. Iatrogenic damage is thought to cause the initial increase in probing depth and attachment loss that is often reported after subgingival mechanical therapy.⁴⁶⁻⁴⁸ These post-therapy effects are particularly evident in shallow pockets of 2.0 to 3.0 mm in depth, possibly because they allow better access and consequently more thorough debride-

ment, which leads to overinstrumentation.⁴⁷ Studies of root surface roughness will continue to produce conflicting data, particularly for ultrasonic scalers, until the power setting, the time period of application and the pressure used are standardized.

Single Versus Multiple Episodes Of S&RP

Another controversy in the literature involves the results from single versus multiple episodes of root debridement. Two groups indicate that no additional clinical improvement is achieved with repeated ultrasonic instrumentation, but rather it causes unnecessary increased loss of root structure.^{29,45,82} However, others report further reduction in pocket depth and improved attachment levels after more than one cycle of S&RP with both hand and ultrasonic scalers.^{16,40,43} Egelberg and co-workers, in more than one study, did not find any difference between ultrasonic and hand scalers with respect to efficiency of root debridement and overinstrumentation, but in two of these studies they showed conflicting results with respect to single versus repeated episodes of instrumentation.^{29,43,82} Possible explanations for these contradictions include the fact that different operators were involved and that since each report had unique goals, different experimental designs were used. Nevertheless, it is essential to keep in mind that treated areas will always need to be re-evaluated periodically.

Conclusion

Although there appears to be definite reasons for using certain root planing instruments in particular situations, such as ultrasonic scalers for furcation areas, the choice of instruments should be based on the skill of the clinician, the time spent in each session, the biological status of the tissues, the anatomy of the roots, the patient's compliance, the instrument forces applied, and the accessibility of the pockets. While selecting an instrument remains a personal choice, using S&RP instruments for

treatment depends to a large extent on treatment goals and the clinician's familiarity with the instruments that are available. The best results are probably obtained by combining sonic/ultrasonic instrumentation with manual scaling.⁸⁶

In summary, the objective of creating a root surface with potential for gain in clinical attachment must be considered in light of the fact that one can do some harm if an incorrect instrument, technique, or treatment option is used. Although it is ideal to obtain absolutely clean root surfaces, it is apparent that there may be a range in which a more realistic incomplete debridement is compatible with clinical periodontal health. It is desirable to use the least damaging techniques that produce the best clinical results. New S&RP instruments to accomplish thorough and more predictable debridement need to be designed and evaluated. Furthermore, detailed and standardized methods of investigation coupled with more clinically relevant data are needed to resolve the present state of confusion with respect to hand and power-driven scalers. This research would help delineate the basis for safe and effective mechanical non-surgical therapy of periodontal disease. ■

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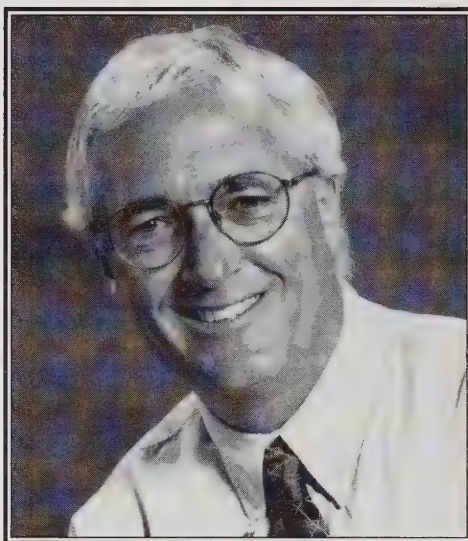
2nd Annual Future of Dentistry Q U E S T I O N N A I R E

Last year at this time, the Dental Industry of Canada (DIAC) surveyed dentists across the country regarding your opinions on the current and future course of dentistry. I am pleased to report that we received a tremendous response to this initial request for input.

We are asking for your assistance again in 1998. By completing the questionnaire opposite and returning it in the postage paid envelope provided in this issue of the CDA Journal, you will help all of those who support your efforts with products and services meet your needs more effectively.

Your Input Is Vital

The Dental Industry Association of Canada is an organization of over 60 Manufacturers, Dealers, Laboratories, Financial Institutions and other companies, all of whom supply products and services to the dental community. Our goal, both as an association and as individual firms, is to serve practicing Canadian dentists to the best of our abilities. To achieve



Mr. Cy Elborne

this, we need information that only you can provide. And, we need a large enough number of completed surveys to make that information truly representative of the opinions of dentists across Canada.

Please Respond Today

Please take a few minutes now to complete the questionnaire and mail it back to us. As a token of our appreciation for all those who participate, we will award a \$1000 travel voucher to one lucky

respondent. An additional ten respondents will receive travel vouchers worth \$100 each. All winners will be determined by a draw from all completed surveys received by May 31, 1998.

All individual responses will be kept completely confidential. The overall compiled results will be shared with all of our members making you, the practicing dentist, the true winners of this survey through improved products and services.

Our Thanks To The CDA

In closing, I would like to thank the Journal of the Canadian Dental Association for their donation of the space for this message and the survey itself. Without their support and assistance, this effort would be impossible to accomplish.

Yours truly,

*Cy Elborne, President
Dental Industry
Association of Canada*

Complete The 2nd Annual Future Of Dentistry Survey

YOU COULD WIN A \$1,000 TRAVEL VOUCHER!

The Dental Industry Association of Canada (DIAC), with the support and help of the CDA Journal, is asking the assistance of dentists across Canada in completing our Second Annual Future of Dentistry survey.

Your input is invaluable in assisting us in identifying and meeting your changing needs. To thank all those who participate, DIAC will award one lucky respondent with a \$1,000 travel voucher. An additional ten respondents will receive travel vouchers worth \$100 each. All winners will be determined by a draw from all completed surveys received by May 31, 1998. The winners will be announced in the CDA Journal. Thank you for your co-operation.

2nd Annual Future of Dentistry QUESTIONNAIRE

Please complete and return this survey by May 31, 1998 to be entered in the draw for a \$1,000 travel voucher or one of ten \$100 travel vouchers.

Product Purchases

Dental Sundries/Consumables Purchases

What approximate percentage of your current sundries/consumables (e.g., paper products, impression material, amalgam, restoratives, cements, diamonds, etc.) purchases do you make from the following sources? What would you expect those percentages to be two years from now?

(NOTE: Totals should equal 100%)

	Current %	Two Years From Now %
Full Service Dealer	_____	_____
Mail Order	_____	_____
Buying Group	_____	_____
Direct from Manufacturer	_____	_____
TOTAL	(100%)	(100%)

If you anticipate any changes in these percentages over the next two years, why do you feel this will occur?

How could Dental Dealers improve their service to you?

How could Dental Manufacturers improve their service to you?

Approximately what percentage of your sundries/consumables are ordered by the following methods? What do you expect those percentages to be in two years? (NOTE: Totals should equal 100%)

	Current %	Two Years From Now %
From Your Sales Representative	_____	_____
By Telephone	_____	_____
By Fax	_____	_____
By Computer	_____	_____
By Internet	_____	_____
TOTAL	(100%)	(100%)

Who decides where the sundries/consumables are ordered from for your practice ? ☐ You personally ☐ One of your staff members

Dental Equipment Purchases

Which of the following equipment do you currently own and/or plan to buy in the next two years?

	Own Today	Buy In 2 Years		Own Today	Buy In 2 Years
Intra-Oral Camera	☐	☐	Office Management System	☐	☐
Air Abrasive Unit	☐	☐	Anesthetic Delivery/Intraligamentary Device	☐	☐
Laser-Cutting	☐	☐	Digital Radiography	☐	☐
Laser-Curing	☐	☐	Office Computer	☐	☐
Interactive Patient Education System	☐	☐	Esthetic Imaging System	☐	☐

Concerning the equipment you plan to buy, which product would you buy first?

Have you ever considered leasing equipment? ☐ YES ☐ NO

If YES, for what term? ☐ 36 months ☐ 48 months ☐ 60 months ☐ 84 months

Who would you approach for capital financing for each of the following? Why would you choose the source for capital financing you indicated for each?

	Source of Capital Financing	Reason For Choosing Source
To purchase a practice?	_____	_____
To expand a practice?	_____	_____
To add new equipment?	_____	_____

Dental Laboratory Product Usage

Do you see your practice placing more, less or the same number of the following types of restorations over the next two years?

	More	Less	Same	None
Porcelain Fused to Metal	☐	☐	☐	☐
All-Ceramic Crowns	☐	☐	☐	☐
All-Ceramic Bridges	☐	☐	☐	☐
Ceramic Veneers	☐	☐	☐	☐
Ceramic Inlays/Onlays	☐	☐	☐	☐
Gold Inlays/Onlays	☐	☐	☐	☐
Indirect Composite Inlays/Onlays	☐	☐	☐	☐
Full Dentures	☐	☐	☐	☐
Partial Dentures	☐	☐	☐	☐
Implant-supported Crowns	☐	☐	☐	☐
Implant-supported Bridges	☐	☐	☐	☐
Implant-supported Full Dentures	☐	☐	☐	☐
Implant-supported Partial Dentures	☐	☐	☐	☐
Removable Orthodontic Appliances	☐	☐	☐	☐
Athletic Mouthguards	☐	☐	☐	☐
Sleep Apnea Appliances	☐	☐	☐	☐

Dental Information

Please rate the following from 1 to 5 (with 1 being Not Valuable and 5 being Extremely Valuable) regarding their influence on your decision to purchase a particular product. (Please circle the appropriate response)

	Not Valuable			Extremely Valuable
Dealer Representative Visit	1	2	3	4 5
Dealer-Sponsored Information Session	1	2	3	4 5
Manufacturer Representative Visit	1	2	3	4 5
Dental Journal Articles	1	2	3	4 5
Dental Journal Advertising	1	2	3	4 5
Special Offer Coupons	1	2	3	4 5
Discounts	1	2	3	4 5
Independent Clinical Studies	1	2	3	4 5
Product Evaluation Organizations	1	2	3	4 5
Dental Peers	1	2	3	4 5
Lectures/Seminars	1	2	3	4 5
Dental Conventions	1	2	3	4 5
Product Literature	1	2	3	4 5
Study Clubs	1	2	3	4 5
The Internet	1	2	3	4 5
Catalogues	1	2	3	4 5
Other (please specify: _____)	1	2	3	4 5

Please rank the Conventions and Annual Meetings you attend each year in order of importance to you:

1. _____
2. _____
3. _____
4. _____
5. _____

Please rate the following from 1 to 5 (with 1 being Not Important and 5 being Extremely Important) regarding their value as a reason for your attending Conventions and Annual Meetings. (Please circle the appropriate response)

	Not Important				Extremely Important
Purchase Products	1	2	3	4	5
Learn About New Products	1	2	3	4	5
Learn About New Techniques	1	2	3	4	5
Attend Clinical/Lecture Sessions	1	2	3	4	5
Social Aspects	1	2	3	4	5
Continuing Education Points	1	2	3	4	5
Other (please specify: _____)	1	2	3	4	5

General Trends In Dentistry

What do you see as the “growth areas” in dentistry in general over the next five years? Why?

Which procedures do you feel will become less common over the next five years? Why?

What is your usage of the Internet as a source of dental information?

- ☐ Frequent
- ☐ Occasional
- ☐ Seldom
- ☐ Never
- ☐ Plan to try in the future

Does your staff use the Internet? ☐ YES ☐ NO ☐ DON'T KNOW

If you or your staff are INTERNET USERS, on a scale of 1 to 10, how valuable is the Internet for:

clinical information _____

product information _____

Method for ordering dental products _____

E-mail _____

Interest/News Groups _____

Consultation with other dentists _____

Consultation with insurance carriers _____

What type of impact do you feel “Managed Care” will have on the Canadian dental market over the next five years?

- ☐ Very Large
- ☐ Large
- ☐ Small
- ☐ Very Small
- ☐ No Impact

Why do you feel that way?

Have you been approached by a Managed Care Organization in the last 6 months ? ☐ YES ☐ NO

Are you currently using, planning to use or considering any of the following in your practice? (Please check all that apply)

	Currently Using	Planning To Use	Considering	Will Not Use
Patient funding	☐	☐	☐	☐
Extended hours	☐	☐	☐	☐
Practice consolidation	☐	☐	☐	☐
Practice consultants	☐	☐	☐	☐
Marketing strategies	☐	☐	☐	☐
In-house Dental Laboratory	☐	☐	☐	☐

Respondent Profile

What term would best describe your practice ? ☐ General Dentistry ☐ Specialist (Please specify speciality: _____)

If you are a General Practitioner, approximately what current percentage of your gross revenue is represented by the following categories of dental work? What would you expect these percentages to be two years from now? (NOTE: Totals should equal 100%)

	Current %	Two Years From Now %
Amalgam restorations	_____	_____
Composite restorations	_____	_____
Crown & Bridge (direct)	_____	_____
Crown & Bridge (indirect)	_____	_____
Hygiene (exams, preventative)	_____	_____
Endodontics	_____	_____
Oral Surgery (corrective)	_____	_____
Orthodontics	_____	_____
Pedodontics	_____	_____
Periodontics	_____	_____
Other (please specify: _____)	_____	_____
TOTAL	(100%)	(100%)

Which province do you practice in? _____

How many years have you practiced dentistry ? ☐ 0-3 years ☐ 4-9 years ☐ 10-15 years
☐ 16-20 years ☐ 21-25 years ☐ 26 years or more

Which type of area would best describe the location of your practice? ☐ Urban ☐ Suburban ☐ Rural

Are you an owner or associate? ☐ Owner ☐ Associate

How many other dentists are there in your practice? ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 or more

How many operatories do you have in your practice ? ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ If more than 5, please specify _____

How many hygienists do you employ ? ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ If more than 3, please specify _____

Thinking of the gross receipts collected in your office over the past 12 months, approximately what percentage was received for each category listed below? What percentage do you feel each category will represent two years from now? (NOTE: Totals should equal 100%)

	Last 12 Months %	Two Years From Now %
Direct payment from patient	_____	_____
Payment from government public assistance programs	_____	_____
Direct payment from private insurance	_____	_____
Payment from Managed Care company	_____	_____
Other sources of payment (please specify: _____)	_____	_____
TOTAL	(100%)	(100%)

Thank you for your time in answering our questions. Please remove the survey and use the postage-paid envelope (addressed to Eric P. Jones & Associates Inc.) inserted into your copy of *CDA Journal* to return it to us before May 31, 1998.

To ensure your name is entered in the draw for the Grand Prize of \$1,000 in travel vouchers or the ten consolation prizes of \$100 in travel vouchers, please fill in your name and address below:

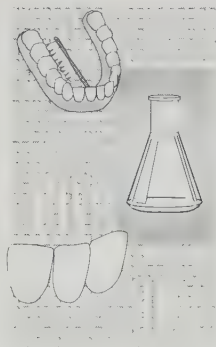
Name: _____

Address: _____

City: _____ Prov.: _____ Postal Code: _____

Telephone: (_____) _____ E-mail: _____

FEATURE



Infective Endocarditis: Dental Implications and New Guidelines For Antibiotic Prophylaxis

Joel B. Epstein, DMD, MSD

ABSTRACT

The American Heart Association (AHA) has developed new guidelines for antibiotic prophylaxis for patients at risk of infective endocarditis (IE). These guidelines are based on the on-going study of endocarditis cases and continued experience with antibiotic prophylaxis, and are an update of the 1990 recommendations. The major changes from the 1990 guidelines are: the recognition that most cases of IE are not attributable to an invasive procedure; that cardiac conditions may present different levels of risk categories; increased delineation of when prophylaxis should be given in cases of mitral valve prolapse; a change to a single dose of antibiotic and changes in the antibiotics recommended for prophylaxis. The revised AHA guidelines parallel those in Europe and the United Kingdom. It is essential that all dental professionals be fully aware of the modifications to these guidelines because of their importance in patient care and their medico-legal implications.

Introduction

Antibiotic prophylaxis for dental patients at risk of infective endocarditis (IE) has been based on limited data. Guidelines have been hampered by a lack of outcome-based data and by

the lack of controlled clinical trials. This has resulted in the publication of guidelines that are based on the opinion of "experts" and consensus conferences. While the guidelines are reviewed and updated, they continue to suffer from a lack of supporting studies. Nevertheless, the guidelines establish medico-legal standards which have become central to the continued use of antibiotic prophylaxis for patients at risk of IE. It is essential that all health care workers remain up to date on the evolution of these guidelines. The American Heart Association (AHA) has completed a major revision of the guidelines and the new ones came into effect as soon as they were published.

The new AHA guidelines are based on a greater understanding of the epidemiology and biology of IE as well as accumulated experience. They address the current data, the need to use antibiotics rationally and responsibly, and the need for public measures to be based on the principles of sound public health policy.

Infective Endocarditis

IE is a rare condition. The incidence rate of IE is 11 to 50 cases per million population.^{1,2} Although the incidence of IE has not changed substantially in recent years, its risk factors have shifted and the population has aged. Changes in the prevalence of risk conditions in-

clude: a decrease in the frequency of rheumatic fever; an increase in the numbers of corrected congenital cardiac defects; an increase in cases of degenerative heart disease; an increase in cardiac valve replacements; and, an epidemic of injection drug use. Some of these factors appear to have resulted in more infections in patients over 60 years of age. Elderly patients are at increased risk because of the increased prevalence of cardiac valve disease, successful valve replacements, aortic stenosis, and impaired immune function.^{3,4} Males are more commonly infected than females. Men over 60 with mitral valve prolapse and systolic hypertension are at increased risk. Mitral valve prolapse has been reported to place patients at risk, but only for those who have regurgitation at the valve. It is estimated that despite the fact that approximately seven million Americans have mitral valve prolapse, only 1,000 of the annual 8,000 cases of IE occur in patients with mitral valve prolapse.⁵ At least 40 per cent of patients with IE have no known risk factors.⁵

The risk of bacterial seeding is highest for patients with a prosthetic heart valve, those with prior cases of infective endocarditis, and those with cyanotic congenital heart disease.¹ A review of all cases of IE admitted to hospital in

Journal

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Dalacin[®] C capsules

(clindamycin hydrochloride)

Antibiotic

ACTION AND CLINICAL PHARMACOLOGY

Clindamycin exerts its antibacterial effect by causing cessation of protein synthesis and also causing a reduction in the rate of synthesis of nucleic acids.

Absorption

Clindamycin is rapidly and almost completely absorbed from the gastrointestinal tract in man and peak serum levels are seen in about 45 minutes. The average peak serum level following a single 150 mg dose in adults is 2.74 mcg/mL. Therapeutically effective average levels at 6 hours after a 150 mg dose of 0.73 mcg/mL are found.

The absorption of clindamycin is not appreciably affected by food intake. Peak serum levels following a single 250 mg oral dose of clindamycin with the patient in the fasting state were 3.1 mcg/mL at 45 minutes whereas the same dose administered with food gave a peak level of 2.4 mcg/mL. A 250 mg dose administered one hour after food gave a peak level of 2.8 mcg/mL but this peak did not occur until two hours after administration of the medication. A 250 mg dose with the patient in a fasting state and with food administered one hour after the medication resulted in peak levels of 3.1 mcg/mL at 1 1/2 hours.

Excretion

The 48 hour urinary excretion of clindamycin in adults following a single dose of 150 mg represented 10.9% of the administered dose (range 4.8% to 12.8%). These measurements were made by bio-assay and both the percent recovered and the urinary concentration are quite variable. The urinary concentration following a single 50 mg dose of clindamycin in the first 24 hours ranged from 8 to 25 mcg/mL of urine.

Fecal excretion of clindamycin has also been determined. Patients on a three week study when administered 1 gram of clindamycin per day had an average of 283 mcg/gm of stool. Patients on lincomycin 2 grams per day under the same conditions showed 3980 mcg/gm of stool. In single dose studies following administration of 250 mg of clindamycin, only 2.7% of the dose was excreted in the feces in 48-96 hours.

Tissue Penetration

In three patients following the administration of 150 mg of clindamycin serum levels reached 2.25 mcg/mL in 2 hours and declined to 1.5 mcg/mL at 4 hours. During this period antibiotic synovial fluid levels were 1 mcg/mL at 2 hours and remained unchanged for the next and last 2 hours of observation.

Various other body fluids and tissues were also assayed for clindamycin and the results of these assays and serum levels at the same time are recorded in Table 1.

TABLE I

Specimen	No. of Specimens	Average Serum Level	Average Fluid Level mcg/mL	Tissue Level mcg/g
Pancreatic fluid (C6-264)	4	1.15	45.1	
Bile (C6-264)	19	3.35	52.45	
Gall Bladder (C6-24)	16	0.81		4.33
Liver (C6-265)	1	42.35		3.80
Kidney (C6-265)	1	1.50		9.07
Bone (C4-390)	2	2.44		9.91

INDICATIONS AND CLINICAL USE

Dalacin C (clindamycin hydrochloride) is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *bacteroides* species, *peptostreptococcus*, anaerobic streptococci, *clostridium* species and microaerophilic streptococci.

Dalacin C is also indicated in serious infections due to sensitive gram-positive organisms (staphylococci, including penicillinase-producing staphylococci, streptococci and pneumococci) when the patient is intolerant of, or the organism resistant to other appropriate antibiotics.

DALACIN C is indicated for prophylaxis against alpha-hemolytic (viridans group) Streptococci before dental, oral and upper respiratory tract surgery.

a) The prophylaxis of bacterial endocarditis in patients allergic to penicillin with any of the following conditions: congenital cardiac malformations, rheumatic and other acquired valvular dysfunction, prosthetic heart valves, previous history of bacterial endocarditis, hypertrophic cardiomyopathy, surgically constructed systemic-pulmonary shunts, mitral valve prolapse with valvular regurgitation or mitral valve prolapse without regurgitation but associated with thickening and/or redundancy of the valve leaflets.

b) Patients taking oral penicillin for prevention or recurrence of rheumatic fever should be given another agent such as clindamycin, for prevention of bacterial endocarditis.

CONTRAINDICATIONS

As with all drugs, the use of Dalacin C (clindamycin hydrochloride) is contraindicated in patients previously found to be hypersensitive to this compound. Although cross-sensitization with Lincocin[®] (lincomycin hydrochloride) has not been demonstrated, it is recommended that Dalacin C not be used in patients who have demonstrated lincomycin sensitivity.

Until further clinical experience is obtained Dalacin C is not indicated in the newborn (infants below 30 days of age), or in pregnant women.

WARNINGS

Some cases of severe and persistent diarrhea have been reported during or after therapy with Dalacin C (clindamycin hydrochloride). This diarrhea has been occasionally associated with blood and mucus in the stools and has at times resulted in acute colitis. When endoscopy has been performed, some of these cases have shown pseudomembrane formation.

If significant diarrhea occurs during therapy, this drug should be discontinued or, if necessary, continued only with close observation. Significant diarrhea occurring up to several weeks post-therapy should be managed as if antibiotic-associated.

If colitis is suspected, endoscopy is recommended. Mild cases showing minimal mucosal changes may respond to simple drug discontinuance. Moderate to severe cases, including those showing ulceration or pseudomembrane formation should be managed with fluid,

electrolyte, and protein supplementation as indicated. Corticoid retention enemas and systemic corticoids may be of help in persistent cases, anticholinergic and antiperistaltic agents may worsen the condition. Other causes of colitis should be considered.

Studies indicate a toxin(s) produced by *Clostridia* (especially *Clostridium difficile*) may be a principal cause of clindamycin and other antibiotic-associated colitis. These studies also indicate that this toxigenic *Clostridium* is usually sensitive *in vitro* to vancomycin. When 125 mg to 500 mg of vancomycin were administered orally four times a day for 5 - 10 or more days, there was a rapid observed disappearance of the toxin from fecal samples and a coincidental recovery from the diarrhea.

It should be noted that serious relapses have occurred up to one month after apparently successful treatment. A relatively prolonged period of continuing observation is therefore recommended.

PRECAUTIONS

Dalacin C (clindamycin hydrochloride) like any drug, should be prescribed with caution in atopic individuals.

The use of antibiotics occasionally results in overgrowth of non-susceptible organisms - particularly yeasts. Should super-infections occur, appropriate measures should be taken as dictated by the clinical situation.

As with all antibiotics, perform culture and sensitivity studies in conjunction with drug therapy.

Since abnormalities of liver function tests have been noted occasionally in animals and man, periodic liver function tests should be performed during prolonged therapy. Blood counts should also be monitored during extended therapy.

Dalacin C may be used in anuric patients. Since the serum half-life of clindamycin in patients with impaired hepatic function is greater than that found in normal patients, the dose of Dalacin C should be appropriately decreased. Hemodialysis and peritoneal dialysis are not effective means of removing the compound from the blood. Periodic serum levels should be determined in patients with severe hepatic and renal insufficiency.

ADVERSE REACTIONS

Only 65 of the 851 patients treated for infections developed side effects representing 7.6% of the total study group or 8.0% of the 813 patients with follow-up. Only 22 of these patients' symptoms were considered due to Dalacin C (clindamycin hydrochloride) for an incidence of 2.7% among the 813 cases with follow-up.

Gastrointestinal: Abdominal pain occurred in 12 patients for an overall incidence of 1.4% in 851 patients and was considered drug related in 7 (0.8%).

Diarrhea occurred in 22 cases for an overall incidence of 2.6% and was drug related in 13 (1.5%). Vomiting occurred in 14 cases with an overall incidence of 1.6%. Seven patients (0.8%) had nausea which was drug related in 2 cases (0.2%). Side effects were severe in 10 instances. (See also under "WARNINGS"). Esophagitis, at times severe, has been reported.

Hemopoietic: Transient neutropenia (leukopenia) has been reported. Its relationship to therapy is unknown. No irreversible hematologic toxicity has been reported.

Skin and Mucous Membranes: Skin rashes have been reported in 6 patients (0.7%), none of which could be determined as drug related. One case of urticaria was reported but its relationship to drug therapy could not be determined.

Liver: Although no direct relationship of Dalacin C to liver dysfunction has been noted, transient abnormalities in liver function tests (elevations of alkaline phosphatase and serum transaminase) have been observed in a few instances.

SYMPTOMS AND TREATMENT OF OVERDOSAGE

No cases of overdosage have been reported. It would be expected however, that should overdosage occur, gastrointestinal side effects including abdominal pain, nausea, vomiting and diarrhea might be seen. During clinical trials one 3-year old child was given 100 mg/kg of Dalacin C (clindamycin hydrochloride) for five days and showed mild abdominal pain and diarrhea. One 13-year old patient was given 75 mg/kg for five days with no side effects. In both cases laboratory values remained normal.

Overdosage should be treated with simple gastric lavage. No specific antidote is known.

DOSAGE AND ADMINISTRATION

Adults: 150 mg every 6 hours.

Moderately severe infections: 300 mg every 6 hours.

Severe infections: 450 mg every 6 hours.

Children (over one month of age):

One of the following two dosage ranges should be selected depending on the severity of the infection:

1. 8-16 mg/kg/day (4-8 mg/lb/day) divided into 3 or 4 equal doses.
2. 16-20 mg/kg/day (8-10 mg/lb/day) divided into 3 or 4 equal doses.

Absorption of Dalacin C (clindamycin hydrochloride) is not appreciably modified by ingestion of food and may be taken with meals.

To avoid the possibility of esophageal irritation, Dalacin C capsules should be taken with a full glass of water.

For prevention of endocarditis: Adults: 300 mg orally 1 hour before procedure; then 150 mg 6 hours after initial dose. **Children:** 10 mg/kg (not to exceed adult dose) orally 1 hour before procedure; then 5 mg/kg 6 hours after initial dose.

Note: With B-hemolytic streptococcal infections, treatment should continue for at least 10 days to diminish the likelihood of subsequent rheumatic fever or glomerulonephritis.

AVAILABILITY OF DOSAGE FORMS

Each capsule contains clindamycin hydrochloride hydrate equivalent to 150 mg or 300 mg clindamycin base. Supplied in bottles of 100 and 500 capsules.

Further product information available on request. 17/08/95

References:

1. Sanford JP et al. The Sanford: Guide to Antimicrobial Therapy (26th ed.) 1996
2. Zambrano et al. Clindamycin in the Treatment of Human Infections 1992. 10 1-24
3. Penicillin Product Monograph: CPS, 32th edition, 1997, CPh A.

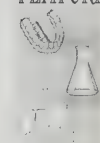


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PAAB



The Netherlands identified 438 cases of endocarditis.² Rheumatic and congenital lesions were the most common risk factors. Mitral valve prolapse was present in 8.3 per cent of cases, and injection drug use was identified as the primary risk in 7.3 per cent of cases.² Prosthetic valve infection has been arbitrarily divided into early or late infection (before or after 60 days), although even for IE that occurs after only 30 days, the relation between the disease and the remote event has been questioned.^{5,6}

During bacteremia, organisms may adhere to damaged cardiac valves or prosthetic valves, depending primarily on the properties of the microbe.⁵ The organism will either be eliminated by host defences or will implant and multiply within approximately two hours. Antibiotics inhibit the growth of adherent bacteria and in cases where the number of adherent bacteria is low, antibiotic activity for six hours will usually result in successful prophylaxis.⁷ A single dose of antibiotic is now recommended because of the lack of evidence that blood levels are needed for more than six or seven hours, and because compliance with multiple dose prophylaxis is questionable.⁸

Morbidity from endocarditis may occur because of cardiac dysfunction and the risk of infected emboli which can result in cerebral vascular accidents (strokes). Mortality from IE depends largely on the organism causing the infection and varies between 15 and 45 per cent, but is higher in the elderly (up to 40 to 70 per cent).⁹

Risk Factors

During a two-year study, 48 cases of IE diagnosed in The Netherlands were compared to controls with the same cardiac status, but without endocarditis.¹⁰ Endocarditis developed in 13 per cent of patients who had a previously diagnosed heart lesion. No differences were seen in the numbers of patients provided antibiotic prophylaxis in either group.¹⁰ The researchers concluded that adherence to prophylaxis guidelines may have little effect on the

Table I

Incidence Of Bacteremia Following Oral Care

Dental Procedure	Percentage
Extractions	51-85
Periodontal surgery	36-88
Scaling	8-80
Suture removal	5-16
Prophylaxis	0-40
Endodontics	0-5
Spontaneous Or Self-induced Procedures	
Toothbrushing	0-26
Dental flossing	0-58
Water irrigation device	7-50
Mastication	17-51

total number of cases of endocarditis in the community.¹⁰

Another study assessed 171 consecutive patients with prosthetic heart valves who developed bacteremia, and 74 per cent developed endocarditis.¹¹ Thirty-three per cent had endocarditis at the time bacteremia was diagnosed, and 11 per cent developed endocarditis within a mean of 45 days after bacteremia was diagnosed.¹¹ Thirty-three per cent developed bacteremia in the presence of intravascular devices.

Prior to the antibiotic era, streptococci were associated with more than 80 per cent of IE cases, but this number has been steadily decreasing and now represents less than 40 per cent of cases.⁵ The decrease of streptococcal IE likely reflects a shift in risk factors for IE including the rise in injection drug use, more patients with prosthetic valves, the use of antibiotics, improved oral care and the aging of the population. Most cases of endocarditis are caused by gram-positive cocci, streptococci, enterococci or staphylococci.^{5,11,12} In one study, staphylococci were the most common organisms, and the number of cases of endocarditis caused by staphylococci are increasing.^{11,12} These findings may be explained by the fact that a specific *Staphylococcus aureus* receptor protein has been

identified on endothelial cells.³ Other studies identify anaerobic bacteria twice as often as aerobic microorganisms.⁴

The incidence of postoperative bacteremia in 149 immunocompetent out-patients following surgery for non-infected skin lesions was found to be 0.7 per cent.¹³ It was concluded that the low incidence of bacteremia and the disadvantage of prophylaxis for staphylococci did not warrant prophylaxis for bacterial endocarditis in such patients.¹³ In contrast, a study of 10 cases of early onset endocarditis identified that the majority were caused by staphylococci, and when subsequent patients were provided prophylaxis with vancomycin and netilmicin, no cases occurred in 138 subsequent valve replacements.¹⁴

Dentistry and Infective Endocarditis

The reported frequency with which endocarditis is ascribed to dental or medical procedures varies from three to 62 per cent.¹⁵ Bacteremia following dental treatment has been documented¹⁶⁻¹⁹ (Table I). The severity of gingival erythema is associated with the incidence and severity of the bacteremia.^{20, 21} An incidence of random spontaneous bacteremia has been reported in 60 to 80 per cent of people,⁵ although the quantity (inoculum size) may be low.



Hall et al randomly selected 60 patients to receive placebo, penicillin V (2.0 g) or amoxicillin (3.0 g) one hour prior to dental extractions, and collected blood before, during and 10 minutes after surgery.¹⁸ The overall incidence rates of bacteremia after extraction were 95 per cent, 90 per cent and 85 per cent respectively. More than 90 per cent of the bacteria were viridans streptococci.¹⁸ In another study, 38 patients randomly received erythromycin (1.0 g) or clindamycin (0.6 g) by mouth one and a half hours before dental extraction.¹⁶ Streptococcal bacteremia was seen in 79 per cent of patients taking erythromycin and 74 per cent of the clindamycin groups.¹⁶ These studies suggest that if antibacterial prophylaxis protects against IE, it must do so by eliminating bacteria at a later stage in the disease, as it does not prevent bacteremia.¹⁶ Antibiotic prophylaxis does not substantially reduce bacteremia following tissue manipulation.⁵ Antibiotics may affect the organism cell wall and prevent implantation, and/or prevent multiplication of implanted bacteria, rather than being bactericidal as is commonly thought.⁵

While in the past it had been felt that dental treatment was associated with IE, the available data show that dental treatment is a possible cause in only a very small number of cases. Since dental visits are common occurrences, merely correlating a prior dental visit with subsequent IE does not prove that the former caused the latter. The mean time to hospitalisation has been shown to be 27 days for mitral valve and 11.5 days for prosthetic valve endocarditis.²² Faulty logic has been applied based on a lack of understanding of the incubation period from infection to symptoms and diagnosis (current estimates are that incubation is two weeks for most cases, and possibly up to one month), the lack of knowledge of the composition of the oral flora, and the lack of recognition of the frequency of bacteremia including bacteremia from oral sources associated with

normal daily living (e.g. tooth brushing, chewing, etc.).⁵

In a study of 171 cases of endocarditis matched with people having similar underlying cardiac conditions placing them at risk of endocarditis it was found that the cases with endocarditis had undergone medical/dental treatments more frequently.¹⁷ Dental procedures as a whole were not associated with an increased risk, however scaling and endodontics did show a trend towards a higher risk of infective endocarditis ($p=0.065$).¹⁷ In a multi-variate analysis the only significant difference between cases and controls was a history of more skin infections, and scaling was the only independent risk factor for viridans streptococcal endocarditis. Forty-six per cent efficacy was seen for antibiotic prophylaxis which was not significant in affecting IE. The researchers attributed the apparent low risk of dental procedures to the current use of antibiotic prophylaxis, however it is possible that this indicates the procedures are inherently low risk. It was estimated that the appropriate use of antibiotics for cardiac patients at risk might reduce the overall incidence of IE by five to ten per cent.¹⁷

In a two-year period, all patients admitted to hospital in The Netherlands with IE were reviewed. Of 427 patients with endocarditis, 64 per cent were eligible for prophylaxis because of previously known cardiac conditions. Of the 275 patients, 23 per cent had undergone a procedure indicated for prophylaxis within 180 days of onset, and 11 per cent had undergone a procedure within 30 days of onset.¹⁵ It was suggested that prophylaxis may have prevented 17 per cent of cases within 180 days of onset and 11 per cent of cases within 30 days, which represented only 5.3 per cent of all cases.¹⁵ It was concluded that medical and dental procedures are associated with only a small fraction of cases of endocarditis.

It has been estimated that less than 25 per cent of cases are associated with streptococcal bacteria (with possible oral origin), and that less than 15 per cent of patients di-

agnosed with IE have seen a dentist within three months prior to diagnosis.²⁰ Taken together, these findings suggest that dental treatment may be associated with less than four per cent of cases of IE, and it is possible that many of these cases are due to bacteremia that occurs outside of the dental office. Epidemiologic studies show that events such as dental treatment currently identified as causative of infection account for a very minor proportion of cases.⁶ Also, the frequent occurrence of spontaneous and non-treatment induced bacteremia of oral microflora has been documented (Table I).

Antibiotic Prophylaxis

Documentation on 52 cases of failed antibiotic prophylaxis has been given to AHA.⁵ In a majority of these cases, non-compliance with earlier guidelines for prophylaxis was identified as the reason for failure. In the cases identified as due to streptococci, some did not demonstrate the appropriate incubation period (within two to four weeks), which raises the possibility that bacteremia occurred at times other than during dental treatment. Even strict adherence to guidelines for prophylaxis may have little effect on the incidence of endocarditis.²³

AHA Guidelines For Prophylaxis Of Infective Endocarditis 1997

The guidelines developed by AHA are intended to aid health care providers, but are not intended to be a standard of care or to substitute for clinical judgment.²⁴ The change to a single dose of antibiotics is based on the findings that transient bacteremia rarely persists beyond 15 minutes, that recommended antibiotics maintain blood levels for an adequate period of time, and that additional doses probably do not provide additional benefit.²⁴ To avoid increasing bacterial resistance to antibiotics, only those patients who require antibiotics should be provided prophylaxis and this coverage should only be provided during the peri-operative period, using a single dose of antibiotics. IE is unlikely to be related

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**Table II****Indications For Antibiotic Prophylaxis⁵**

Prophylaxis Recommended:	Prophylaxis NOT Recommended:
Prior infective endocarditis Cardiac valve prosthesis Coarctation of the aorta Rheumatic heart disease Hypertrophic cardiomyopathy Ventriculoatrial shunts for hydrocephalus Mitral valve surgery with murmur Mitral valve prolapse with regurgitation Indwelling catheter (right heart) Idiopathic hypertrophic aortic stenosis Kawasaki disease with regurgitation Congenital heart disease: Aortic stenosis Bicuspid aortic valve Complex cyanotic heart disease Patent ductus arteriosus Tetralogy of Fallot Ventricular septal defect Surgically repaired intracardiac lesions with residual hemodynamic abnormalities	Secundum atrial septal defect Coronary bypass surgery Congenital pulmonary stenosis Prior rheumatic fever without valve dysfunction Coronary artery disease Cardiac pacemakers; implanted defibrillators Mitral valve prolapse without regurgitation Functional heart murmur Orthopedic joint prosthesis Orthopedic pins and screws Kawasaki disease without regurgitation More than six months after surgery without residua Ligated ductus arteriosus Ventricular septal defect Arterial grafts

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to a procedure provided more than two weeks earlier, and most cases of IE are not attributable to invasive procedures.²⁴

Prophylaxis is recommended for patients who have underlying moderate to high risk conditions for IE, and when there is a potential risk of bacteremia associated with a planned procedure. Additional considerations include the potential for adverse reactions to the antibiotic used, and cost-benefit considerations of the proposed prophylaxis. Based on the risk of outcome if IE occurs, some cardiac conditions are associated with risk of IE and others are not (**Tables II and III**). Because of the frequent and excessive use of antibiotic prophylaxis for patients with mitral valve prolapse, an algorithm has been developed by AHA (**Table IV**). The use of antibiotic prophylaxis has been supported for surgical procedures on infected tissue in patients with a high risk of a cardiac lesion, and

for surgical procedures in patients with a prosthetic heart valve.²⁵ Injection drug users are at increased risk of IE. The highest risk patients are those with a prior history of IE, those with prosthetic cardiac valves and surgically constructed systemic pulmonary shunts and those with complex cyanotic congenital heart disease. Moderate risk has been described for patients with a heart murmur following rheumatic fever, most congenital heart malformations, hypertrophic cardiomyopathy and mitral valve prolapse with regurgitation.

The potential for procedures to induce bacteremia must also be considered. It is known that bacteremia is common during daily living, and that the risk of bacteremia is increased in individuals with chronic infections such as gingivitis and chronic periodontal and dental disease. The degree of bacteremia has also been found to be related to the severity of inflammation and infection.²⁴ Procedures

that are anticipated to cause significant bleeding are considered to place patients at risk of bacteremia. These include surgery, subgingival procedures, placing orthodontic bands where bleeding is anticipated, intraligamentary anesthesia, and endodontics extending beyond the apex. Prophylaxis should be provided to at-risk patients for dental procedures that are expected to cause significant bleeding (**Table V**). It has been suggested that the use of antiseptic rinses prior to dental procedures may reduce the incidence and/or magnitude of bacteremia.²⁴ If unanticipated bleeding occurs during treatment, administration of the appropriate antibiotic prophylaxis should be started at that time.²⁴ It is thought that antibiotic prophylaxis may be effective if begun within two hours, and that it is unlikely that benefit will be achieved after four hours.²⁴ It should be noted that edentulous patients who develop ulcerations

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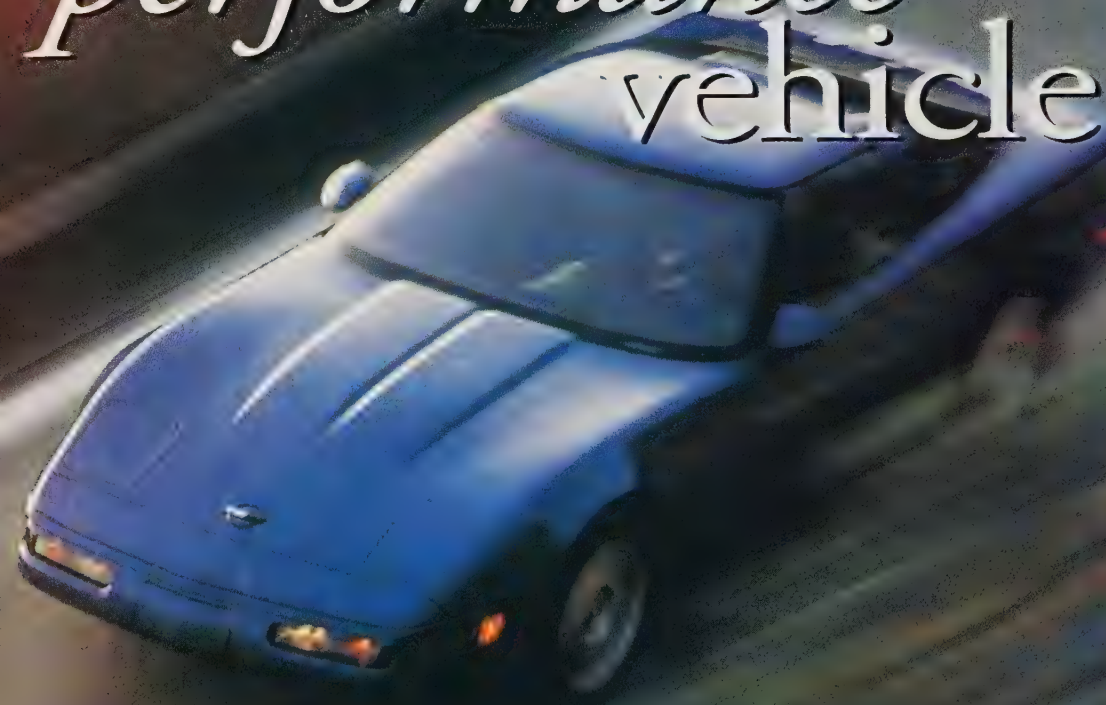
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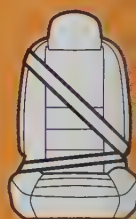
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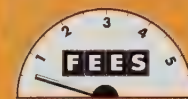
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Table III

Cardiac Conditions Associated With Risk Of Infective Endocarditis²⁴

High-risk Conditions:
• prosthetic cardiac valves • previous infective endocarditis • complex cyanotic congenital heart disease • surgically constructed pulmonary shunts
Moderate-risk Conditions:
• most congenital cardiac malformations (other than those above and below) • acquired valve dysfunction (e.g. rheumatic heart disease, collagen vascular disease) • hypertrophic cardiomyopathy • mitral valve prolapse with regurgitation or thickened leaflets
Conditions For Which Prophylaxis Is Not Recommended:
• isolated atrial septal defect • surgically repaired atrial or ventricular septal defect, ductus arteriosus (without sequelae after six months) • previous coronary bypass graft surgery • mitral valve prolapse without valve regurgitation • functional (innocent) heart murmur • previous Kawasaki disease without valve dysfunction • previous rheumatic fever without valve dysfunction • cardiac pacemakers and implanted defibrillators

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associated with dentures may be at risk of bacteremia. For this reason, it is recommended that patients with dentures receive periodic examinations, and that follow-up be conducted after the delivery of a new prosthesis. Procedures considered not to require prophylaxis in at-risk patients are those that do not cause bleeding and those that involve minimal tissue manipulation such as suture removal, local anesthetic blocks and infiltration, impressions, intraoral radiographs, and fluoride application.

The current 1997 recommendations of AHA are shown in **Table VI**. Amoxicillin has been recommended as the oral agent of choice for standard prophylaxis, because it is well absorbed when taken orally and provides higher and more sustained blood levels.²⁴ Erythromycin is no longer recommended because it causes gastrointestinal irritation, and its absorption and distribution is variable. Alternative antibiotics, including clindamycin, azithromycin and clarithromycin, should be used instead. Intramus-

cular (IM) or intravenous (IV) administration of antibiotics are recommended for high risk patients.²⁴ For patients on anticoagulants (e.g.: heparin and warfarin) IM injection should be avoided. If an injectable route must be used, it should be intravenous administration. Because of the potential for over-prescription of antibiotics for patients with mitral valve prolapse, an algorithm has been developed (**Table IV**).

General Considerations

When antibiotic prophylaxis is deemed necessary, it is essential that the appropriate antibiotic be chosen for the organism most likely to place the patient at risk of IE, based on the nature of the procedure. The antibiotic must be present in the blood before the invasive procedure.

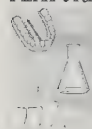
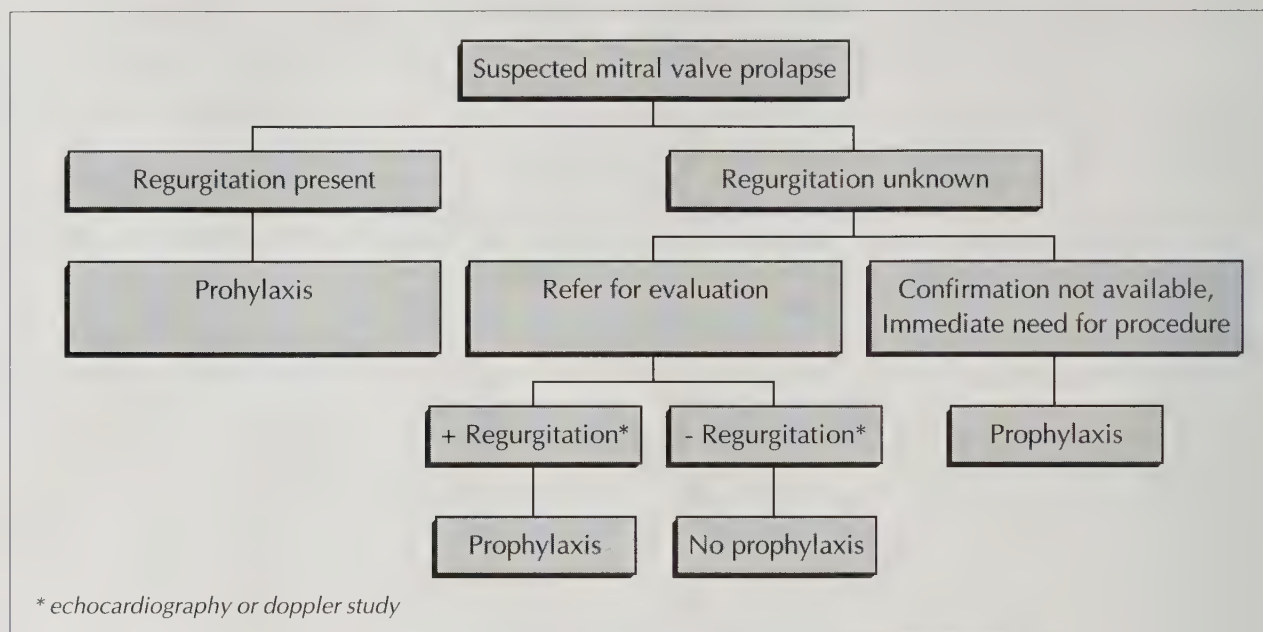
Prophylaxis is not required for mitral valve prolapse without regurgitation. While the presence of a heart murmur and regurgitation may be identified by a skilled clinician, echocardiography is often used for diagnosis. The absence of

regurgitation is more difficult to diagnose, as regurgitation can be present without the detection of a murmur. If the absence of regurgitation is not established, antibiotic cover is appropriate.

It may be best not to repeat prophylaxis until nine to 14 days after the last use of prophylaxis. For patients on antibiotics (particularly penicillin derivatives or cephalosporins), it is appropriate to select an antibiotic from a different class of agent for prophylaxis. Clindamycin, azithromycin or clarithromycin may be appropriate choices. Another alternative would be to discontinue the previously prescribed antibiotic for nine to 14 days prior to prophylaxis.

Oral rinsing with antiseptics such as 10 per cent povidone iodine or chlorhexidine (15 ml for 30 seconds) is recommended prior to dental treatment.^{5,26}

If unanticipated bleeding occurs during the treatment of an at-risk patient, the appropriate antibiotic can be provided immediately

**Table IV****Approach To Determine the Need For Prophylaxis For Mitral Valve Prolapse²⁴**

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and treatment can be continued. This recommendation is based on data that suggest antibiotics begun up to two hours after the procedure may provide protection.

It may be necessary to inform patients and medical providers alike of the changes in the current guidelines. The 1997 revisions to the AHA guidelines parallel those made in the United Kingdom and Europe,^{1,5,27-29} and together provide important medico-legal support for health care workers.

The new guidelines also recommend that a complete dental assessment be made prior to cardiac surgery. Dental treatment should also be completed prior to cardiac surgery whenever possible because this may reduce the chances of endocarditis.²⁴ Although there is limited data available, AHA recommends that patients receive prophylaxis following heart transplantation because these patients are at risk of acquiring valve dysfunction, and because of the continuing immunosuppression in these patients.

Cost-effective Analysis

Most preventive public health measures are of great benefit to society because they address high

exposure conditions with acceptable costs and risks. Examples are fluoridation in dentistry, and immunisation in medicine. While IE may be considered a high exposure condition because of the number of dental procedures performed on at-risk patients, in fact, IE rarely occurs. Therefore, antibiotic prophylaxis for IE is an intervention that is of uncertain benefit and that poses a potential risk.

Oral amoxicillin prophylaxis for all mitral valve prolapse patients was estimated to prevent 32 cases of IE per million dental procedures, at a cost of \$119,000 per prevented case.³⁰ It was estimated that limiting prophylaxis to cases with murmurs associated with mitral valve would prevent 80 cases of IE per million procedures for a cost of \$19,000 per case. Intravenous antibiotics might cause a net loss of life. Prevention with oral antibiotics was felt to be "reasonably" cost-effective for mitral valve prolapse with murmurs.³⁰

The risk of IE was calculated from published data from the United Kingdom, based on the numbers of deaths from endocarditis and the number of high risk dental procedures performed without antibiotic prophylaxis.³¹ Sixty-three

patients were evaluated over the 10-year period between 1980 and 1990. For every 10,000 extractions in at-risk patients, prophylaxis was estimated to prevent 5.7 deaths and 22.85 cases of IE. This represented a savings in hospital costs of £289,600 for 10,000 extractions. It was concluded that prophylaxis prior to dental extractions was cost-effective.³¹

For any public health measure, the benefits must outweigh the risks. In the case of antibiotic use, these considerations include the risk of toxicity of the medication, the risk of allergic reaction (especially anaphylaxis) and other drug interactions, the risk of superinfection of the patient by resistant organisms, and selection of organisms that are resistant to current antibiotics. One of the goals of the updated guidelines is to avoid these complications by reducing the use of antibiotics. The continuing use of antibiotics is now well recognized to place pressure on microorganisms. This has resulted in an increasing number of infections that are difficult to manage because the organisms involved are resistant to current antimicrobials.

Myths about IE persist. These include a myth that most cases of



bacterial endocarditis are of oral origin, as a result of dental procedures. Oral streptococci are now associated with less than 25 per cent of cases of endocarditis. Less than 15 per cent of patients who develop IE had medical or dental treatment in the three months before their diagnosis and less than four per cent of cases of IE are associated with dental treatment.^{5,32} It is also believed that the prophylaxis recommended by AHA gives almost total protection against endocarditis following dental procedures, despite continuing reports of the failure of prophylaxis. Some believe that all patients with mitral valve prolapse should receive prophylaxis and that all clinicians should err on the side of using antibiotic prophylaxis.³³

Guidelines must be based on a sound and thorough review of scientific literature, and they should be continually reviewed and revised. Continuing education regarding the current guidelines, current literature, and additional research on this topic is needed for the medical and dental profession, and their patients. ■

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Table V

Dental Procedures and Endocarditis Prophylaxis²⁴

Prophylaxis Recommended:

- dental extractions and other surgery
- periodontal procedures including dental prophylaxis, subgingival procedures and probing, if bleeding is anticipated
- dental implant placement, reimplantation of avulsed teeth
- endodontic procedures beyond the apex
- initial placement of orthodontic bands, but not brackets
- intraligamentary anesthesia

Prophylaxis NOT Recommended:

- restorative dental treatment, if bleeding is not anticipated
- local anesthesia (other than intraligamentary)
- intracanal endodontic treatment; post placement
- placement of rubber dam
- suture removal
- oral impressions
- fluoride treatment
- intraoral radiographs
- shedding of primary teeth

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Table VI

Guidelines For Infective Endocarditis Antibiotic Prophylaxis 1997²⁴

Oral Route:

Amoxicillin Adults: 2.0 g
Children: 50 mg/kg, PO, one hour before procedure

Unable To Take Oral Medications:

Ampicillin Adults: 2.0 g
Children: 50 mg/kg, IM or IV, 30 minutes before procedure

Allergy To Penicillin:

Clindamycin Adults: 600 mg
Children: 20 mg/kg, PO, 1 hour before procedure
Cephalexin or cefadroxil*
Adults: 2.0 g
Children: 50 mg/kg, PO, 1 hour before procedure
Azithromycin or clarithromycin
Adults: 500 mg
Children: 15 mg/kg, PO, 1 hour before procedure

Allergic To Penicillin and Unable To Take Oral Medications:

Clindamycin Adults: 600 mg
Children: 20 mg/kg, IV, within 30 minutes before procedure
Cefazolin* Adults: 1.0 g
Children: 25 mg/kg, IM or IV, within 30 minutes before procedure

*cephalosporins should not be used in patients with immediate-type hypersensitivity to penicillins (urticaria, angioedema, anaphylaxis).

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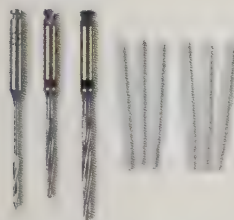
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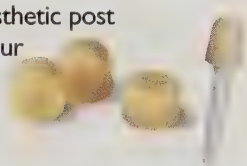
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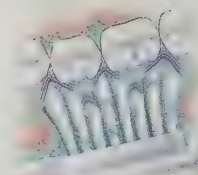
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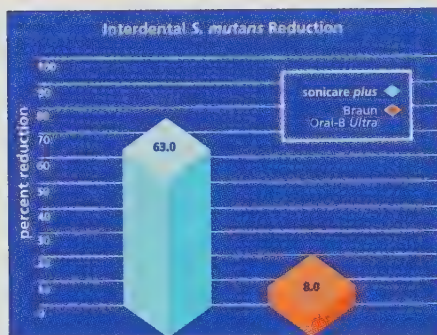
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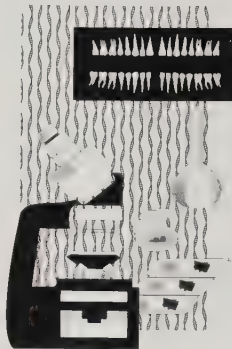
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RESEARCH



An Update Of Mechanical Oral Hygiene Practices: Evidence-Based Recommendations For Disease Prevention

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ABSTRACT

Purpose: This review updates the mechanical oral hygiene practices discussed at a 1986 State-of-the-Science Workshop.

Methods: The 1984-1995 MEDLINE database was searched and appropriate studies that used disease outcome measurements were located and selected. Recommendations were made based on the levels of evidence concept.

Recommendations: 1) There is good evidence to recommend: toothbrushing twice daily with fluoridated toothpaste; using oscillating-rotating or counter-rotational-action electric toothbrushes; flossing for adults; personal supragingival irrigation as an adjunct to toothbrushing; and scaling of disease active sites for the treatment of periodontal diseases. 2) There is moderate evidence to recommend: using any soft-bristled manual toothbrush; using wooden interdental cleaners; scaling of disease active sites every three to four months for patients with histories of moderate/severe periodontitis; scaling of disease active sites at intervals of ≥ 6 months for most patients, based on patient need; and removal of restoration overhangs. 3) There is moderate evidence to

not recommend: use of vibrating, rotating or sonic action electric toothbrushes; using foam brushes; flossing for children; using interdental brushes; gingival massage; and tongue brushing or scraping. 4) There is good evidence to not recommend: subgingival scaling for patients with no signs of active disease; and polishing for disease prevention.

Conclusions: Consistent with the 1986 workshop report, the 1996 recommendations emphasize the importance of personal oral hygiene and the provision of professional treatment when personal care fails to prevent disease.

Key Words: oral hygiene, prevention, dental self-care, toothbrushing, interdental hygiene, flossing, scaling, root planing, recommendations.

In 1986, a State-of-the-Science review on mechanical oral hygiene practices was presented by Frandsen at a National Institute of Dental Research (NIDR) conference.¹ Due to changes in disease prevalence, technology, and study design, an update of this review is warranted.

The importance of disease outcome measures was noted in the 1986 report, but many of the reviewed studies measured only

plaque removal, which is an intermediate outcome. Evidence now shows that total plaque removal may not be necessary for the prevention of disease.^{2,3} Low levels of plaque are compatible with periodontal health.⁴ Even in the absence of oral hygiene practices, some individuals do not develop periodontitis.⁵ Similarly, caries experience and individual plaque control are poorly related.^{6,7}

The best evidence that, for example, flossing results in a benefit would be a direct causal link between asymptomatic individuals, flossing, and a reduced incidence of dental caries. This is shown as causal link No. 3 in Fig. 1,⁸ which illustrates the potential causal pathways for dental flossing. However, as there is no evidence to support causal link No. 3, we can only infer flossing's effectiveness by combining causal links Nos. 1 and 2.

Combining causal links is not appropriate when disease states have been studied using direct measure outcomes. In light of the current evidence that low levels of plaque are compatible with periodontal health,⁴ this paper will only consider studies that report on disease outcomes. These outcomes, as well as evidence-based criteria, will be used to update the review presented by Frandsen at

the 1986 NIDR conference on Dental Plaque Control Measures and Oral Hygiene Practices.

Methods

Between November 1995 and March 1996, literature searches of the 1984-1995 MEDLINE database were completed at the University of Toronto. The MeSH headings periodontal disease and dental caries were combined with key words such as oral hygiene, toothbrush, flossing, interdental, irrigation, scaling, prophylaxis, and root planing. All searches were limited to the English language and local holdings. Articles were also identified by hand searches and by perusing bibliographies.

Inclusion and exclusion criteria were used to screen identified articles. Only human studies assessing mechanical oral hygiene interventions using disease outcome measurements were included. No studies of chemical/pharmaceutical interventions were included. All articles meeting these criteria were subsequently examined for internal and external validity.⁹

Each mechanical oral hygiene practice selected for the literature review was rated using the levels of evidence developed by the Canadian Task Force on the Periodic Health Examination (Table I).¹⁰ Based on this classification scheme, recommendations for specific mechanical oral hygiene practices were made. All recommendations (Tables II to V) were based on the literature review of personal and professional mechanical oral hygiene practices. No attempt was made to rank practices based on clinical superiority.

Review Of the Literature

Personal Mechanical Oral Hygiene Practices

Toothbrushing

Toothbrushing remains the most popular means of oral cleansing in North America. Nearly the entire North American population reports brushing daily.^{1,11,12} Toothbrushing is also the vehicle for delivering the topical fluoride contained in fluoridated toothpaste to tooth surfaces. There are indications that tooth-

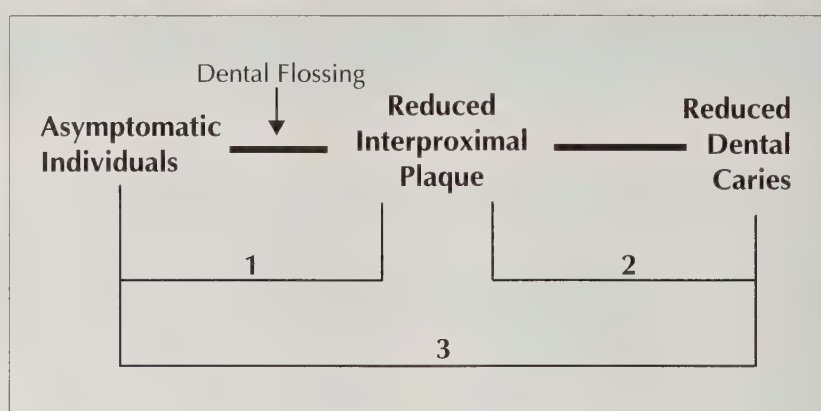


Fig. 1: Prevention of interproximal caries (causal pathway).

Table I

Levels Of Evidence and Classification Of Recommendations*

Level Of Evidence:	
I:	Evidence from at least one properly randomized controlled trial.
II:	Evidence from at least one well-designed controlled trial without randomization, from cohort or case-control analytic studies, preferably from more than one centre, from multiple time series, or from dramatic results in uncontrolled experiments.
III:	Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees.
Recommendations:	
A:	Good evidence to support a recommendation for use.
B:	Moderate evidence to support a recommendation for use.
C:	Recommendation for, or against, use based on poor evidence.
D:	Moderate evidence to support a recommendation against use.
E:	Good evidence to support a recommendation against use.
NR:	No evidence available to make a recommendation.

*Adapted from Goldbloom and Battista¹⁰

brush-delivered dentifrice fluoride is largely responsible for the caries prevalence decline in developed countries since the 1970s.¹³

The anticaries effectiveness of fluoridated dentifrice is well established.¹⁴ Toothbrushing's effectiveness independent of fluoride delivery is less well established, primarily due to ethical restrictions and the ubiquitous use of fluoridated dentifrice. This paper's recommendations are therefore based on the practice of toothbrushing with fluoridated toothpaste and their combined ef-

fect on dental caries and periodontal diseases.^{11,14-18}

a) Frequency: The 1986 workshop advocated brushing up to twice a day for improvement in plaque levels and gingival health. It concluded that there was insufficient evidence to prove the benefit of toothbrushing in reducing caries incidence, and that the quality of brushing was more important than the frequency of brushing.

Subsequent studies have reported that toothbrushing twice daily with fluoridated dentifrice is an

shown no advantage over manual toothbrushing.^{1,29} The 1986 workshop's advice was based on an assessment of first-generation vibrating and rotating electric toothbrushes. Subsequent advances in technology have produced several powered toothbrush designs with unique motions. Some of these designs are more effective than manual toothbrushes in preventing or reducing the severity of gingivitis. They are also less likely to cause gingival damage.^{26,30,31}

Oscillating/rotating action and counter-rotational-action electric toothbrushes are more effective in controlling gingivitis than manual toothbrushes.³¹⁻³⁴ These devices may be especially good for people with special needs, such as orthodontic patients.^{33,35-37}

There is no advantage to using other kinds of powered brushes, such as vibrating, rotating, or sonic action electric toothbrushes.^{29,38-42} Due to the increased expense of these brushes, their use is not recommended.

Supplemental Oral Hygiene Methods

Supplemental oral hygiene may be necessary to reach areas that are not accessible by thorough toothbrushing.⁴³ However, not everyone requires these methods to maintain periodontal health.⁴⁴

a) Interdental Hygiene: The 1986 workshop recommended interdental cleaning, since it is impossible to clean all interproximal surfaces by toothbrushing alone. A scientific basis for recommending any particular practice had not been established, however. Despite improved study designs, a single superior interdental hygiene aid has not yet been developed.⁴⁵

Dental Floss: Toothbrushing plus flossing has been shown to improve gingival health in adults when compared to toothbrushing alone.^{46,47} Although daily flossing and increased flossing frequency have recently been associated with improved periodontal health,^{11,48} the optimal flossing frequency remains undetermined. Furthermore, flossing is recognized to be progressively less effective as interproximal recession

becomes more pronounced and interdental spaces are enlarged.⁴⁹

Different aids and types of floss have been designed to improve the efficacy of flossing, facilitate patient compliance, or attract market attention. No significant differences in the therapeutic ability of different flosses or tape have been demonstrated.^{45,47,49} Likewise, flossing aids have not provided additional benefits compared to conventional flossing.⁵⁰⁻⁵⁴

Flossing by children has not produced additional improvements in gingival health compared to toothbrushing alone.⁵¹ Although flossing by children has been recommended to develop the skill and establish a habit,⁹ there is no optimal age for its introduction and no evidence that a habit can be established.

Wooden Interdental Cleaners: The 1986 workshop suggested using wooden cleaners to reduce interproximal gingivitis. Toothbrushing supplemented by the use of wooden interdental cleaners has produced greater reductions in gingival bleeding than toothbrushing alone,^{46,55-57} and no harmful effects have been reported.

Interdental Brush: The 1986 workshop suggested using interdental brushes. There is consensus that these brushes are superior interdental cleaning devices when sufficient space exists to allow their use.⁴⁹ However, interdental brushes have not demonstrated clinical superiority over other interdental aids or toothbrushing alone.^{45,58,59}

b) Unituft Or End-tuft Brush: Unreported by the 1986 workshop, the smaller head of the unituft brush allows access to areas that are difficult to reach.^{60,61} Compared to toothbrushing alone, its supplemental use has been reported to reduce gingivitis in adults.⁶² Professional monitoring is advisable, however, because the concentrated force of the unituft brush's action can result in gingival trauma.

c) Gingival Massage: The use of rubber-tip stimulators has not demonstrated any additional benefits over toothbrushing alone for reducing gingivitis.⁵⁹ In agreement with the findings of the 1986

workshop, rubber-tip stimulation has resulted in little significant clinical benefit.⁶³

d) Supragingival Irrigation: The 1986 workshop did not recommend supragingival irrigation as a supplement to normal oral hygiene. However, supragingival irrigation has been reported to reduce gingival inflammation.⁶⁴⁻⁶⁷

The harmful effects of supragingival irrigation with water appear to be minimal. However, expert opinion recommends that individuals at risk for bacterial endocarditis should avoid irrigation,⁴⁹ and that all patients should delay irrigation for one month after any oral surgery.⁶⁸

e) Subgingival Irrigation: Subgingival irrigation directs the irrigant below the gingival margin in an attempt to flush the gingival sulcus or pocket. Although it may prove useful in improving periodontal health, its use has not been evaluated.

f) Tongue Brushing Or Tongue Scraping: Tongue brushing and tongue scraping were not discussed by the 1986 workshop. When used as an adjunct to toothbrushing, tongue debridement has not contributed to a reduction in gingivitis.⁶⁹

Professional Care

Professional care includes a variety of mechanical practices, which were described as "oral prophylaxis" by the 1986 workshop.

Scaling

Frandsen's review questioned whether the total removal of plaque, calculus and contaminated material from tooth surfaces was really necessary. It is not known how much calculus is compatible with periodontal health,^{3,70} as healing may occur in periodontal pockets despite residual calculus.⁷¹ Therefore, scaling should be directed only at disease active sites.^{49,72} At present, four indicators of disease activity are commonly used: bleeding on probing; loss of periodontal attachment; increase in pocket depths; and suppuration.

The 1986 workshop recommended scaling for patients with existing periodontitis. When combined

Table II

Summary Of Recommendations: Personal Mechanical Oral Hygiene Practices — Toothbrushing

Practice	Effectiveness	Level Of Evidence	Recommendation
Toothbrushing	Twice daily brushing with fluoridated toothpaste prevents caries and controls gingivitis.	I ^{11,14,17-20}	Good evidence to recommend brushing twice daily with fluoride dentifrice for caries prevention and control of gingivitis (A).*
Manual Toothbrushing			
Nylon bristled toothbrushes	Any soft-bristled toothbrush can be used in control of gingivitis.	I ^{1,22-27}	Moderate evidence to recommend using any commercially available soft-bristled toothbrush (B).
Foam toothbrushes	Less effective than conventional toothbrushes in control of gingivitis.	I ²⁸	Moderate evidence to not recommend using foam brushes for control of gingivitis (D).
Electric Toothbrushing			
Oscillating/rotating or counter-rotational action electrically powered toothbrushes	More effective than manual toothbrushes in controlling gingivitis.	I ³²⁻³⁷	Good evidence to recommend use of oscillating/rotating or counter-rotational electric toothbrushes for control of gingivitis (A). Recommended for limited dexterity, non-compliant, and fixed orthodontic appliance patients (A).
Rotary, vibrating or sonic action electrically powered toothbrushes	Not more effective than manual toothbrushing in controlling gingivitis	I ^{29,38-42}	Moderate evidence to not recommend use of rotary, vibrating or sonic action electric toothbrushes for most adults (D).

* Caries reduction may be largely due to the effect of fluoride.

effective means of caries reduction, compared to brushing less frequently.^{19,20} This caries reduction may be largely due to the use of fluoridated toothpaste, however, and not directly attributable to toothbrushing. Neither toothbrushing *per se*, nor increases in brushing frequency, have been shown to prevent caries.¹⁶ Although studies suggest that increased toothbrushing frequency is related to improved periodontal health,¹¹ no optimum frequency has been determined. The recommendation to brush twice daily is consistent with both periodontal health and reduced caries incidence.

b) Method: The 1986 workshop reported no clinically significant differences between various brushing methods, although the roll method was the least effective for plaque

removal. None of the literature published since 1986 supports recommending a specific method. However, forceful brushing should be avoided regardless of the method employed.²¹

c) Toothbrush Design: Since 1986, there has been continued interest in the effectiveness of various toothbrush designs. Recognizing the public's ineffectiveness at plaque removal measures, manufacturers have attempted to maximize toothbrush efficiency and improve patient acceptance of available products.

Manual Toothbrushes: Frandsen recommended that a good toothbrush have the following characteristics: a small head to facilitate access; wide long handle for easy grip; 0.2 mm x 10 mm soft nylon bristles with rounded bristle ends

to minimize gingival damage; and a multi-tufted, straight-trimmed brush head for optimal cleansing effect. Current studies suggest serrated tufts, raised toe bristles, and an angled head are also effective toothbrush features.²²⁻²⁴ Contrary to previous findings, recent studies report that modern serrated toothbrushes cause no significant oral irritation.²²⁻²⁶ Therefore, most commercially available soft-bristled toothbrushes can be effectively used for prevention or control of dental diseases.^{22-25,27}

An alternative toothbrush design is a foam brush, which is advocated for gentler oral hygiene. Toothbrushing with this device is less effective than conventional toothbrushing at reducing the severity of gingivitis.²⁸

Electric Toothbrushes: Historically, powered toothbrushing has

Table III

Summary Of Recommendations: Personal Mechanical Oral Hygiene Practices — Supplemental Methods

Practice	Effectiveness	Level Of Evidence	Recommendation
Interdental			
i) Dental floss	More effective than toothbrushing alone in controlling gingivitis in adults. Not effective in preventing gingivitis in children. More effective than toothbrushing alone in controlling periodontitis.	I ^{46,47,49} I ⁵¹ II ^{11,48}	Good evidence to recommend flossing as an adjunct to toothbrushing for control of gingivitis in adults (A). Moderate evidence not to recommend flossing to control gingivitis in children (D). Moderate evidence to recommend one method of interdental hygiene for control of periodontitis (B).
ii) Wooden interdental cleaner	More effective than toothbrushing alone in controlling gingivitis in adults.	II ^{46,49,55-57}	Moderate evidence to recommend use of wooden interdental cleaners for control of gingivitis in adults (B).
iii) Interdental brush	Not more effective than toothbrushing alone in reducing gingivitis.	II ^{58,59}	Moderate evidence not to recommend use of interdental brushes (D).
Other			
Unituft or end-tuft brush	Effective adjunct to toothbrushing in controlling gingivitis in adults.	I ⁶²	Moderate evidence to recommend unituft or end-tuft brushes for control of gingivitis, for adults not performing interdental hygiene (B).
Gingival massage	Not more effective in controlling gingivitis compared to toothbrushing alone.	II ^{59,63}	Moderate evidence not to recommend the use of rubber-tip stimulation as a supplemental method of controlling gingivitis (D).
Supragingival irrigation	Effective in controlling gingivitis in adults with inadequate oral hygiene or patients with orthodontic appliances.	I ⁶⁴⁻⁶⁷	Good evidence to recommend supragingival irrigation for control of gingivitis for adults with inadequate oral hygiene or patients with orthodontic appliances (A).
Subgingival irrigation	Not evaluated as an adjunct to toothbrushing.	—	No recommendation (NR).
Tongue brushing or scraping	Not effective in controlling gingivitis	I ⁶⁹	Moderate evidence to recommend against tongue brushing for controlling gingivitis (D).

with long-term maintenance therapy following periodontal surgery, subgingival and supragingival scaling may be equally effective in controlling periodontitis.⁷³⁻⁷⁷

Although subgingival scaling is required in initial therapy, its role in maintenance therapy has re-

cently been questioned.⁷⁰ Subgingival scaling is not necessary for patients with good oral hygiene and no disease active sites. Supragingival scaling, combined with adequate home care, is effective in preserving the periodontal health of these patients.⁷⁸⁻⁸¹

a) Frequency: The interval between recall visits should be based on disease status and the patient's past history of periodontal diseases. Patients must be assessed at each visit to determine if disease active sites are present. Subgingival scaling is only necessary in these areas.

Table IV

Summary Of Recommendations: Professional Mechanical Oral Hygiene Practices — Scaling and Root Planing

Practice	Effectiveness	Level Of Evidence	Recommendation
Scaling	Scaling may be as effective as surgery in arresting periodontal destruction in disease active sites, when followed by long-term maintenance therapy.	I ⁷³⁻⁷⁷	Good evidence to recommend scaling for initial therapy in patients with active periodontitis, when combined with maintenance therapy (A).
	Supragingival scaling effective in maintaining periodontal health, when combined with adequate personal oral hygiene.	II ^{70,78-81}	Moderate evidence to recommend supragingival scaling of disease active sites, for maintenance therapy (B).
	Subgingival scaling of shallow pockets can cause loss of periodontal attachment	I ⁷⁴⁻⁷⁶	Good evidence to recommend against subgingival scaling in sites with no signs of disease (E).
	Subgingival scaling may not be necessary in maintenance therapy, if personal oral hygiene is adequate	II ^{70,78-81}	Moderate evidence to recommend against subgingival scaling for maintenance therapy, if personal oral hygiene adequate (D).
Frequency	• <i>patients with histories of moderate/severe periodontitis:</i> scaling of disease active sites, at 3 to 4 month intervals, is effective in maintaining periodontal health	I ^{49,82,83}	Moderate evidence to recommend maintenance therapy every 3 to 4 months for patients with histories of moderate or severe periodontitis (B).
	• <i>for most patients:</i> regular dental visits are associated with less periodontal attachment loss; no evidence that 6 month recall is optimal frequency	I ^{49,84,86}	Moderate evidence to recommend scaling disease active sites at intervals of ≥ 6 months, based on patient need (B).
Ultrasonic Devices	Compared to hand instruments, equally effective in treatment of single-rooted teeth	I ⁹⁰⁻⁹²	Moderate evidence to recommend the use of ultrasonic devices in periodontal therapy of single-rooted teeth (B).
Root Planing	No evidence regarding additional benefits of root planing in periodontal therapy	—	No recommendation (NR).

In agreement with the 1986 workshop, maintenance therapy is recommended every three to four months for patients with histories of moderate or severe periodontitis.^{49,82,83} Intervals may be increased beyond four months if periodontal health is maintained over several years.⁸²

Regular dental visitors experience less periodontal attachment loss than irregular visitors.^{11,48,84} All patients should be monitored regularly, however, as gingivitis or mild periodontitis may progress.⁷² Most experts agree that recall intervals should be set on a patient specific basis, and determined only after the patient's oral hy-

giene, disease activity, individual susceptibility, and disease history have been evaluated.^{1,9,49,83,85}

No evidence supports six months as the optimal frequency between recall appointments. Regular six month intervals are no more effective than longer intervals for preventing periodontitis or

Table V

Summary Of Recommendations: Professional Mechanical Oral Hygiene Practices — Other Procedures

Practice	Effectiveness	Level Of Evidence	Recommendation
Polishing			
Rubber Cup and Paste	Polishing, prior to topical fluoride application (TFA), is not necessary for maximum caries prevention. Not effective in controlling gingivitis.	II ⁹⁵⁻⁹⁷ I ^{83,86}	Good evidence to recommend against polishing prior to TFA for caries prevention (E). Good evidence to recommend against polishing for control of gingivitis (E).
Air-polishing	Not evaluated.	—	No recommendation (NR).
Removal of overhangs	Restoration overhangs are associated with deeper periodontal pockets. • Method of overhang removal has not been evaluated	II ^{101,103} —	Moderate evidence to recommend the removal of overhanging margins for periodontal therapy (B). No recommendation (NR).
Supragingival irrigation with saline /water	Controls gingivitis when used at frequent intervals; intervals between procedures unsuitable for professional practice.	III ⁷⁴	Not recommended for use in periodontal therapy (C).
Subgingival irrigation with saline /water	When combined with scaling, may control periodontal diseases; intervals between procedures unsuitable for professional practice.	I ^{104,105}	Not recommended for use in periodontal therapy (C).

controlling gingivitis in healthy patients.^{1,85,86}

b) Adverse Effects: Scaling is an invasive procedure with many adverse effects. Subgingival scaling of shallow pockets can cause permanent loss of periodontal attachment.⁷⁴⁻⁷⁶ Enamel surfaces can be damaged through repeated scaling,⁸⁷ and tooth sensitivity and gingival recession are relatively common.⁸⁸ Finally, patients with certain medical conditions are at risk for bacteremias during scaling and must receive prophylactic antibiotic coverage.⁸⁹

c) Ultrasonic and Sonic Devices: The 1986 workshop advised that hand and ultrasonic instruments were equally effective for single-rooted teeth. Clinical evidence and expert opinion have support-

ed this conclusion.^{49,90} Sonic devices are also effective in improving periodontal conditions.⁹¹ Both devices should be used in conjunction with hand instruments, because their tips are unable to access certain tooth surfaces. Scaling with ultrasonic devices may cause excessive heat and subsequent tooth sensitivity and pulpal damage.⁹²

Root Planing

The 1986 workshop and other reviews^{70,93,94} have questioned the clinical significance of root planing. There is a lack of scientific evidence regarding the effects of root planing beyond the effects that can be achieved with subgingival scaling alone.

Polishing

The 1986 workshop advised that polishing with rubber cup and abrasive paste is ineffective in disease prevention. Polishing prior to topical fluoride application is not necessary to achieve maximum caries prevention.^{76,95-97} At intervals of longer than two weeks, polishing is also ineffective in controlling gingivitis.^{83,86,98} It should only be done to remove extrinsic stains in areas where patients are concerned about esthetics.

Air polishing systems were not reviewed by Frandsen. Recommendations cannot be made for or against these devices, because studies have not reported disease outcomes. These devices are potentially harmful,⁹⁹ however, and

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Letters To The Editor
Continued from page 240 ...

Basing public health policies on accurate risk assessments and effective preventive measures is an admirable, justified approach. Unfortunately, it is one which CDA applies in a selective manner to the detriment of its credibility. The discipline of evidence-based care has clearly established procedures, practices and principles. Until these are fully understood by CDA officials, they will continue to misuse evidence-based concepts to satisfy immediate objectives. In the arena of public health policy, this is a dangerous practice unless CDA has corroborating proof, which, to date, it has failed to disclose.

If it wishes to pursue credible, effective leadership, CDA should subject all guidelines on public health policies to the principle enunciated by Dr. Gushue, and justify the evidence-based nature of its infection control policies by employing the accepted published criteria.

John Hardie, BDS, M.Sc., PhD, FRCDC
Saudi Arabia

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Guidelines On the Use Of Space Maintainers

Dr. D.J. Brothwell's *Journal* article, "Guidelines On the Use Of Space Maintainers Following Premature Loss Of Primary Teeth," is disturbing (*J Can Dent Assoc* 63:753-766, 1997).

A number of professional organizations, including CDA, are exploring the role of guidelines as aids in practice. In addition, licensing bodies such as the Royal College of Dental Surgeons of Ontario (RCDSO) have embraced guidelines as a key element in their quality assurance programs.

Although hundreds of guidelines have been published by medicine and dentistry in North America, most, unfortunately, have been produced by inadequate development methods and have had little positive impact on the quality of practice. Guideline production is not a regulated activity, but the prospect of individuals adding to the growing volume must concern the profession.

Dr. Brothwell, as a graduate student in the department of community dentistry, University of Toronto, has been well-schooled in the evidence-based methods developed in Canada by the med-

ical profession.¹ However, there are some fundamental shortcomings in his approach.

Validation before the release of a guideline is an essential part of the guideline development process.² When organizations initiate the guideline development process, they usually establish an expert panel from the relevant clinical specialties. More recently, such panels have included general practitioners, research scientists and even members of the public. The names, qualifications and institutional affiliations of these individuals are published with the guidelines.

Among its other functions, the panel conducts a critical appraisal of the studies identified by a literature search and through other means. This is not simply a review of abstracts, but a detailed examination of the articles to determine the internal validity of the method, results and conclusions. The external validity is assessed in terms of whether the experimental findings are applicable to practice conditions. For example, reports of statistically significant results may not have practical clinical significance. Assessment by clinical experts is especially critical where the scientific evidence is weak or equivocal.

After the panel submits its report, it is common practice to have a second review by independent, external experts. An excellent example of this process at work can be seen in a guideline on acute sinusitis that was published recently in the *Canadian Medical Association Journal (CMAJ)*.³

There is no evidence in Dr. Brothwell's article that the method described entailed more than an evaluation by the author of abstracts produced by a Medline search. The validity, and therefore credibility, of a guideline must be established by full disclosure of the analytical method used, as well as the strength of the expert panel's (and if they were used, the external reviewers') professional consensus.



A crucial step in planning guideline development is the initial decision on whether the proposed topic has a sufficiently strong scientific basis to warrant the effort, since with any currently acceptable method, the process is time-consuming and expensive. Due to apparently weak scientific literature, the topic of Dr. Brothwell's guideline produced a Class C recommendation. This means that the guideline neither supports nor advises against the intervention. Whether guidelines such as this should be published at all is an issue among those involved in guideline development, since such indeterminate statements provide little meaningful aid to practitioners. Those who support publication, even when the literature evidence cannot support a clear statement, suggest that these guidelines identify the need for clinical research.

To help resolve this issue, the CMAJ has encouraged contributors to write systematic reviews.⁴ These involve a comprehensive literature review and critical appraisal of a narrowly focused topic such as the intervention selected by Dr. Brothwell. Such investigations could, as the CMAJ editor suggested, identify research needs while avoiding duplication of research in some areas. This would seem to be a much preferred initial step in assessing our clinical knowledge base, and would avoid the uncontrolled growth of well intentioned but unhelpful "guidelines."

Russell G. Stephens, DDS, M.Sc.
London, Ont.

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Dental Education

I have several comments to offer on Dr. H.E. ElBadrawy's article, "Dental Education — A Clinical Analysis and Opinion" (*J Can Dent Assoc* 63:680-686, 1997).

As a "past dental student," I cannot allow Dr. ElBadrawy's claim that "There has never been a problem with dental education per se" to go unchallenged.

There were many problems during my four years of dental education. To begin with, the very concept that nearly 90 per cent of my education as a dentist could be completed within the confines of one (or two) lecture theatres, a student laboratory and a student clinic is ludicrous. In my opinion, this hardly constitutes a well rounded approach to dental education.

Secondly, the climate in which I was educated was "students versus professors." Information was delivered with little dialogue between students and educators, and evaluation was based on rote memory, "do or die" clinical examinations, and general day to day authoritarian clinical supervision. Hardly an environment that encourages healthy discourse and rigorous intellectual examination of subject matter.

In part, my dissatisfaction with my own "dental student experience" encouraged me to become involved in dental education. As an educator who has devoted significant time to the field of dental education, both overseas (in the field of international developmental dentistry) and in Canada (in the realm of exposing dental and dental hygiene students to the social nature of health and disease), I can say that there is always room for improvement.

Dr. ElBadrawy's assessment that curriculum restructuring is often driven by financial and administrative pressures is accurate. But his sarcastic dramatization — "to induce the perception that the dental faculty will become so innovative

in its approach to education, and will graduate such an elite cadre of dentists, that the university will realize its folly in ever having considered its closure" — mocks serious attempts to improve on existing course curricula in dental schools.

Some examples of innovative approaches to dental education are: New Jersey's community oriented dental education initiative, which strives "to increase student exposure to community service and community-based learning activities;"¹ the Pennsylvania experiment, where flexible curricula incorporate student placements in dental schools in developing countries and in community locations outside of the United States;² and the Canada-Mozambique dental project, where an assessment of the working conditions and performance of dental workers preceded the revision of the curricula for teaching primary care dentistry in Mozambique.³

Each of these three initiatives places the dental student in the broader community, which helps them to become well rounded health care professionals.

Interestingly, Dr. ElBadrawy concludes his article by offering a rational approach to curriculum planning, which I fully endorse. The time has come for a serious re-examination of the manner in which we educate dentists in Canada. The author's closing comments regarding the solicitation of input from both dental students and clinical teachers as an initial step along this path is an excellent beginning.

The privatization of dental schools is not a positive direction for the profession. Imagine, the Crest School of Dentistry, or the Coca-Cola Faculty of Dental Medicine?

Joel Rosenbloom, DDS
Queen West Community
Health Centre
Toronto, Ont.

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Hygiene's Competitive Challenge To Dentistry

I am writing in response to Dr. Dan Coffin's letter, "Hygiene's Competitive Challenge to Dentistry" (Coffin, D. [Letters] *J Can Dent Assoc* 63:576, 1997).

As president of the Canadian Dental Hygienists Association (CDHA), I feel it is very important that I respond to the inaccurate statements Dr. Coffin made regarding our vision for the dental hygiene profession and its relationship with dentistry, and more specifically, the implied threat of independent practice.

CDHA, as the national advocacy body for dental hygienists in Canada, provides support for the regulation of dental hygienists by the dental hygiene profession. However, self regulation and independent practice are not synonymous. The first relates to the democratic principle of self government, and the other to a financial arrangement for service. It is inappropriate to continually convey that one is the direct end result of the other.

Self regulation is not unique or radical, it is merely the recognition that a profession is responsible for its own body of knowledge, education, licensure and practice, in order to ensure public protection. Dental hygienists are now a self regulating profession (in fact, 92 per cent of all dental hygienists in Canada are self-regulating), as are other similar professionals, including nurses, occupational therapists and physical therapists.

Self governance carries with it tremendous responsibilities. Our profession is fully aware of all the moral, legal and ethical obligations associated with this privilege. The "dental team" relationship that exists between the dental hygienist and dentist does not change with self-regulation. How-

ever, there is a recognition that the dental hygienist and dentist both, regardless of practice setting, are accountable first to their respective licensing body.

CDHA believes that "oral health is integral to general health. As health professionals, dental hygienists serve the health needs of all Canadians in a variety of roles and environments, working with other health care professionals to make health care available to all Canadians. In all roles and practice environments, dental hygienists use accepted dental hygiene process to provide service based on recognized practice, research and theory."

In June 1992, CDHA adopted a position statement on the Management of Dental Hygiene Care, which states: "CDHA supports collaborative practice wherein a partnership exists between dental hygienists and other health professionals participating in the delivery of comprehensive oral care."

As one of a group (not the only one) of licensed primary oral health care professionals, we define "primary" as providing direct client care and follow-up. At no time has CDHA ever had a "stated goal — to be the primary oral health provider" of dental care to Canadians," nor have we stated that dental hygienists should "be the entry point to access," as Dr. Coffin suggests. CDHA is not advocating substitution of our services for those of the dentist, but, rather, is encouraging the continuation of collaborative care to the public.

Today, a large portion of our society still has no access to even basic dental hygiene and dental care. In fact, only part of our population is accessing care through private dental offices, where the majority of dental hygienists presently practice. CDHA believes that dental hygienists have a role to play in providing dental hygiene care to under-served populations in many diverse community environments, including home care, hospice care and long-term care to name a few.

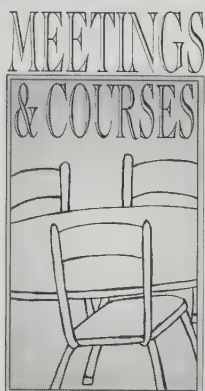
The desire to work in the community is not new. Dental hygiene can trace its roots back to the 1950s, when we were introduced to Canadians as primary oral health care providers through public health programs. The increase in these alternative dental hygiene practice settings (beyond private practice) creates opportunities for dental hygienists to collaborate and support the dental profession, as they refer all clients for dental care. The ultimate outcome of such arrangements would be the increased access of Canadians to affordable, accessible oral health care.

At this point in time, we believe that it is not organized dental hygiene that is your challenge, but, rather, the changing environment and its related forces which surround both of us — whether they be the public's increased demand for decision making, managed care, flexible insurance plans, changing technologies or shared responsibilities. With these external pressures present, it would seem an appropriate time for dental hygiene and dentistry to examine our future together and identify new opportunities for collaborative action, as stated in the CDHA's President's Message that appeared in the Nov/Dec 1996 issue of *Probe*.

In these changing times, it is more important than ever for dentistry and dental hygiene to work collaboratively to deliver health care to all Canadians. We come prepared to meet this challenge as a government-recognized profession with a distinct Code of Ethics, national standards, and public accountability. Because both our professions will always have the mutual goal of achieving optimal oral health, we value the working relationship we have with CDA and are optimistic that the pressure of individual members to create disharmony will not prevail.

Judy Clarke, RDH
CDHA President
Nepean, Ont.

Letters may be edited for space and clarity, at the discretion of the editor



INTERNATIONAL



June 25-27

5th Dental International Congress of the Turkish Dental Association in Bursa, Turkey. Contact Chamber of Dentists of Bursa, Altiparmak Cad. Petek Ish.K.4, Bursa, Turkey. Tel.: 90 (0) 224-222-69-69; fax: 90 (0) 224-223-53-59.

July 2-4

1st Chinese International Conference on Comprehensive Orthodontics in Nanjing, China. Contact Javisa International Ltd., 425 University Ave., Suite 301, Toronto, ON M5G 1T6. Tel. (collect): (416) 595-9877; fax: (416) 595-9565.

August 25-29

15th Jubilee "Ákrövy" Congress of the Hungarian Dental Association in Budapest, Hungary. Contact MOTESZ Congress Bureau, 1051 Budapest, Nádor u. 36., 1443 Budapest, Pf. 145 Hungary. Tel.: (36-1) 111-66 87; fax: (36-1) 183-79 18; e-mail: motesz@mail.elender.hu; internet: www.motesz.hu.

August 26-30

1998 New Zealand Dental Association Conference in Wellington, New Zealand. Contact Dr. W. Gaudie, Conference Secretariat, P.O. Box 5321, Wellington, NZ. Tel.: +64 4 384 7606; fax: +64 4 384 6594; e-mail: wmgaudie@clear.net.nz

September 8-11

135th British Pharmaceutical Conference in Eastbourne, England. Contact BPC Secretariat, Royal Pharmaceutical Society of Great Britain, 1 Lambeth High St., London SE1 7JN, U.K. Tel.: 44 (0) 171 820-3241; fax: 44 (0) 171 735-7629.

CANADA



May 1-2

Nitrous Oxide Conscious Sedation in Halifax, Nova Scotia. Presenters: Drs. David Donaldson and Daniel Haas. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5. Tel.: (902) 494-1674; fax: (902) 494-2527.

May 1-2

15th Annual Meeting of the Academy of Sports Dentistry in Columbus, Ohio. Contact Dr. Frank Stechey, Suite 202, 151 York Blvd., Hamilton, ON L8R 3M2. Tel.: (905) 577-0770; fax: (905) 577-0721.

May 6

American Academy of the History of Dentistry in conjunction with the **American Association of the History of Medicine** will meet prior to the ODA/CDA Convention in Toronto, Ont. Contact Dr. Audrey Davis, 1214 Bolton St., Baltimore, Md. 21217. Tel.: (410) 728-4810; e-mail: mabdavis@earthlink.net

May 7

25th Reunion Dinner and Dance, University of Toronto Class of 1973 on Toronto Island, Ont. Contact Dr. Helen Johnston. Tel.: (416) 924-4695.

May 8

Reception for Dalhousie Alumni to be held in conjunction with the National ODA/CDA Convention in Toronto, Ont. Contact Jane Bolivar. Tel.: (902) 494-1674; fax: (902) 494-2527.

May 8

Academy of Dentistry International Dinner and Convocation in Toronto, Ont. Contact Dr. Don Stewart. Tel.: (416) 447-0111.

May 9

International College of Dentists Dinner and Convocation in Toronto, Ont. Contact Dr. Fil Cappa. Tel.: (519) 471-9217.

May 8-9

6th International Symposium on Facial Growth Guidance in Edmonton, Alta. Contact Dr. Ben Eastwood, 1203 Baker Centre, 10025 106 St., Edmonton, AB T5J 1G4. Fax: (403) 425-2769.

May 30

Contemporary Restorative Materials and Cosmetic Dentistry in Winnipeg, Man. Presenter: Dr. Charles W. Wakefield. Contact Ms. Darcy Duggan, Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, MB R3E 0W2. Tel.: (204) 789-3331; fax: (204) 789-3912.

May 30

Latest Developments in Clinical Perio and Record Management in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

May 30

Dentists and Dental Imaging in Halifax, Nova Scotia. Presenter: Dr. Barry Pass. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5. Tel.: (902) 494-1674; fax: (902) 494-2527.

June 5-6

Clinical Endodontics in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6.

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Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

June 12

Annual Meeting of the Quantum Study Club in association with The Association of Prosthodontists of Canada in Montreal, Que. Contact Dr. Michael Moscovitch, President of the Quantum Study Club, 370-4150 St. Catherine St. W., Westmount, QC H3Z 2Y5. Tel.: (514) 935-5211; fax: (514) 935-5261; e-mail: mospros@aol.com

June 17-20 and July 8-9

Cosmetic Dentistry in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

July 10-17

I.V. Conscious Sedation in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

July 16-19

Annual Meeting of the Canadian Association of Oral and Maxillofacial Surgeons in Vancouver, B.C. Contact CAOMS/ANZAOMS Secretariat, c/o Water Street Planning Group, Third Floor, 353 Water St., Vancouver, BC V6B 1B8. Tel.: 1-888-549-3301 (in Canada only), fax: (604) 681-1292.

July 30 - August 1

Aesthetics '98 — International Symposium on Excellence in General Practice and Aesthetic Dentistry in Whistler, B.C. Contact Ms. Debbie Larocque, McGill University. Tel.: (514) 398-7203, ext. 4165; fax: (514) 398-8900. Or contact Ms. Olga Chodan. Tel.: (514) 398-7221.

August 26-29

34th Annual General Meeting of The Canadian Academy of En-

dodontics in Charlottetown, PEI. Contact Dr. Wayne A. Maillet. Tel.: (902) 494-5129; fax: (902) 494-2527; e-mail: w.maillet@dal.ca

September 10-12

6th Annual Meeting of The Canadian Academy of Restorative Dentistry and Prosthodontics in Winnipeg, Man. Contact Ms. Barb Malinowski, Executive Secretary to the CARDP 1998 Convention Chairman, 5-2230 McPhillips St., Winnipeg, MB R2V 3C8. Tel.: (204) 694-2042; fax: (204) 694-4052.

September 25-27

Pediatric Restorative Materials in Calgary, Alta. Presenter: Dr. Kevin Donly in conjunction with the Canadian Academy of Pediatric Dentistry Annual Meeting. Contact Dr. Robert Barsky. Tel.: (403) 247-3166; fax: (403) 247-2534.

U.S.A.



August 5-8

23rd American Academy of Esthetic Dentistry Annual Meeting: The Pursuit of Esthetic Excellence in Philadelphia, Pa. Contact AAED Headquarters, 1807 S. Washington St., Suite 106, Naperville, IL 60565. Tel.: (630) 355-0424; fax (630) 355-0474.

September 16-19

28th Annual Session of the American College of Prosthodontists — Current Controversies In Prosthodontics in San Diego, Calif. Contact ACP, 211 E. Chicago Ave., Chicago IL 60611. Tel.: 1-800-378-1260.

DENTAL MEETINGS



May 7-9

ODA/CDA National Convention in Toronto, Ont. Contact Ms. Patricia Brennan. Tel.: (613) 523-1770,

ext. 246, or 1-800-267-6354; fax: (613) 523-3062.

May 23-27

27^e Congrès annuel de l'Ordre des dentistes du Québec in Montréal, Que. Contact Dr. Denis Forest. Tel.: (514) 875-8511; fax: (514) 875-1561.

May 29-30

New Brunswick Dental Society Annual Meeting in St. Andrews, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; fax (506) 452-1872.

June 4-6

Prince Edward Island Dental Association Annual Meeting in Woodstock. Contact Ms. Nettie Likely. Tel.: (902) 566-5199; fax: (902) 892-4470.

June 8-14

92nd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. Robert Mast. Tel.: (403) 346-7331; fax (403) 342-0133.

June 12-13

Nova Scotia Dental Association Annual Meeting in Yarmouth, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; fax: (902) 423-6537.

June 18-20

Newfoundland Dental Association Annual Meeting in St. John's, Nfld. Contact Dr. Gary Butler. Tel.: (709) 368-1431; fax (709) 364-1770.

June 18-20

Annual Scientific Session of the College of Dental Surgeons of Saskatchewan in Saskatoon, Sask. Contact Dr. Damara Rayner. Tel.: (306) 978-1700; fax: (306) 978-1732.

Notices of meetings and continuing education courses are published without charge for appropriate **not-for-profit** dental organizations, teaching facilities or recognized study clubs. Information must be received two months prior to the expected publication date, and will be published at the discretion of the editor. Send all requests c/o Ms. Rachel Galipeau, *Journal* editorial assistant, Canadian Dental Association, 1815 Alta Vista Dr., Ottawa, ON K1G 3Y6.

ODA/CDA 1998 NATIONAL CONVENTION



ALPHABETICAL LISTING OF EXHIBITORS

3I Implant Innovations 2002
3M Canada Company 1505, 1507, 1509, 1604, 1606, 1608

A A-Dec, Inc. 1617, 1619, 1716, 1718
A.R. Medicom Inc. 1913
Abel Computers Inc. 917, 919
Accelwhite Inc. 2322
Adams Brands Inc. 2102, 2104
Aerostatic Technology Canada 1228
Affordable Dental Technology 2105
Alpha Dental Supplies Ltd. 2116
Alpha Protech 713
Altamira Investment Services 2416
American Business Card 2303
American Dental Hygienics 910
Ancin Inc. 1908
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APG Computing 1130
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Aurum Ceramic/Classic 1317

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Belmont/Takara Company Canada Ltd. 703, 705, 802, 804
Benson/Porter 1219
Best Glove Mfg. Ltd. 1428
Beutlich LP Dentalus USA 1725
Biodent 2103
Biotene Canada 1030
Biotrol International 1723
Bisco Dental Products Inc. 1222, 1224
Block Drug Company (Canada) Ltd. 1613
Blue & Green Inc. 416
Bontempi Medical Corporation 1028
Brasseler Canada 1017, 1019
Budget Dental Supplies Inc. 916
Buffalo/Bolton Dental Mfg. Inc. (BDM) 616, 618
Busse Dental Supplies 716
Byte Dental Systems Inc. 203, 302

C Caesy Education Systems 808, 810
Canadian Dental Auto Leasing 1612
Canadian Dental Service Plans Inc. 1511, 1513
Canadian Dental Association 1523, 1525, 1622, 1624
Canadian Sugar Institute 1909
Canebsco Reception Room Subscription Service 2022
Capital Builder Financial Corp. 2028
Captek 1810
Central Dental Laboratories (Barrie) Ltd. 1016
Central Florida Tissue Bank 2130
Cerum Dental Supplies 1319
Cerum Ortho Organizers 1418
CIBC 710, 712
Clinical Research Dental Supplies 1316, 1318
Colgate Oral Pharmaceuticals 1113, 1212
Coltene/Whaledent 2013
Confi-Dent Inc. 2216
Cosmedent Inc. 1822
Criticare Systems Inc. 2609

D Dairy Farmers of Canada 1829
DDS Dental Supply 831, 833
De Luca Dental Laboratories 2113
Degussa/Ney 1824
Del Pharmaceuticals 2119
Den-Mat Corporation 2203
Den-Tal-Ez 717, 719, 816, 818
Dent-X 503, 505, 602, 604
Dental Advantage 1630
Dental Medical Office Supply 2005
Dentalware 708
Dentistry Canada Fund 1728
Dentsply Canada Limited 905, 907, 909, 911, 913,
..... 1004, 1006, 1008, 1010, 1012
Designs For Vision, Inc. 2112
Dexis 1911
Discus Dental Canada 2123, 2125, 2222, 2224
Domtrak Systems Ltd. 502
Dulong Medical Inc. 2031
Duro-Test Canada Inc. 912

E Ellman International, Inc. 2117
Entertainment Resources 625
Exan/Mercedes 2019, 2118

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F	Flow X-RAY	811
	Fortune Investment Corp.	2618

G	Galileo International	216
	GC America/EDS/Pascal/Young	819
	Germiphene Corporation	619, 718
	Glide Products By Gore	612
	Golden Hands Millwork	2109
	Great Lakes Orthodontics	422

H	Harcourt Brace	2132
	Harry J. Bosworth Company	1825
	Head-To-Toe Uniforms	1117, 1119
	Hedy Canada	1924
	Henry Schein Canada	723, 725, 822, 824
	Heraeus Kulzer	622
	Higa Manufacturing Ltd.	1022
	Hoechst Marion Roussel	2202
	Hot Towel Company	1929
	Hu-Friedy Mfg. Co., Inc.	707, 709

I	ICS	517
	Innova Corp.	2212
	Interplak By Conair	509
	Ivoclar North America Inc.	1023, 1025, 1122, 1124

J	J. Morita USA, Inc.	512
	J.E. Jelenko & Co.	624
	John O. Butler Company	1804, 1806, 1808
	Johnson & Johnson	504, 506

K	K-Dental	1322
	Kerr Corporation	2316, 2318
	Kidzpace	722
	Kilgore International, Inc.	513
	Kodak Canada Inc. - Dental Products	1616, 1618

L	L.A.K. Enterprises	933
	Lac-Mac Limited	2217, 2219
	Larr Sales	1128
	Lexi-Comp	2302
	Lindberg & Homburger Ltd.	1705
	Logic Tech Corp.	1809, 1811, 1813

M	M&C Dental Cabinet Systems	603, 605, 702, 704
	M/S Caslow (PVT) Limited	1907
	Marus Dental International	1223, 1225
	Marz Kinetics Inc.	1129
	Maxill Inc.	2029, 2128
	Maxim Software Systems	1629
	MDS/Matrix	1628

	Medical Mart Supplies Ltd.	613
	Merit Travel Group Inc.	623
	Milestone Scientific	817
	Miltex Instrument Company, Inc.	918

N	National Dental Direct	2204, 2206, 2208, 2210
	National Dosimetry Services	1125
	Nesbitt Burns	1528
	Newcourt Financial	1803, 1805, 1807, 1902, 1904, 1906
	Nobel Biocare Canada Inc.	516, 518

O	Oasis	2007
	Ontario Dental Association	1323, 1325, 1422, 1424
	Ontario Dental Nurses & Assistants Association	523, 525
	Ontario Dental Hygienists Association	2325
	OP-D-OP Visor Shields	2312
	Oral-B Laboratories	1216, 1218
	Orthodontic Supply of Canada	417
	Oxyfresh	1331

P	Paragon Implants	2218
	Patient News Publishing	2009, 2011
	Patterson Dental Canada Inc.	1005, 1007, 1009, 1011, 1013, 1104, 1106, 1108, 1110, 1112
	Petit Cache	1625
	Philips Dental Care Products	2006
	Posen & Furie Dental Laboratory	1712
	Pottruff & Smith Insurance Brokers	724
	POW Laboratories Inc.	1217
	Practice Made Perfect Software Inc.	519
	Premier Dental Canada	1229
	Prestige Medical	2213
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	Pro-Art Dental Laboratory	2017
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	Professional Practice Sales Ltd.	220, 222
	Pulpdent, Gingipak, Health Sonics	2317, 2319

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THURSDAY, MAY 7, 2 P.M. & FRIDAY, MAY 8, 10 A.M. & 2 P.M.



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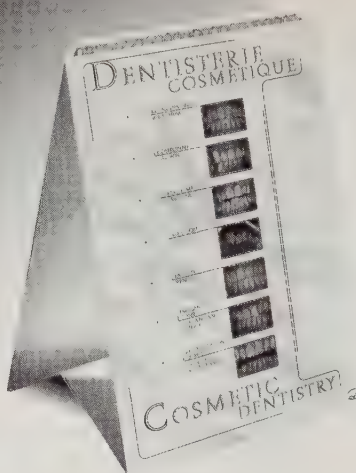
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Dentistry After the Fee Guide

David Schwab, PhD

Just prior to visiting Edmonton in February to present a marketing seminar to the Edmonton and District Dental Society, I learned that the Alberta Dental Association's fee guide is now a thing of the past.

This is a very important development. In reality, Alberta's fee guide was always something of a false friend. Although it provided a level of security to dentists by removing the anxiety associated with setting and explaining fees to an increasingly value conscious public, it effectively placed a cap on their earning power. And because the vast majority of dentists adhered strictly to the fee guide, they inadvertently ceded control of their practice profitability to third parties.

It is true that following the fee guide allowed Alberta dentists to make a comfortable living. However, it also flattened out the differences between dentists, i.e., the best dentists earned no more for a given procedure than their less skilled counterparts.

The fee guide took shape in the 20th century at a time when the world was still trying to follow 19th-century business conventions. It was created in a clubby world of brandy snifters, fine cigars, and overstuffed chairs — a style of conducting business that permeated all types of commerce back then, including the practice of dentistry.

Professionals, including dentists, did not consider themselves to be businessmen. There was a

gentleman's understanding (until recently there were few, if any, women in the profession) that a dentist avoided discussing fees with patients. Dentists did not try to gain a competitive advantage over their colleagues, and there were enough patients to keep all the dentists busy all the time.

As we approach the 21st century, there are no quaint gentlemen's agreements to shelter dentists from competition. The truth is, as a relic of a bygone era, the fee guide had long ago become more of a problem than a solution. Its passing should be celebrated, not mourned.

Although price is only one element in the marketing mix (the others are product, place, promotion, and people), it does allow dentists to differentiate themselves from the competition. This won't happen overnight, as many Alberta dentists will initially follow the 1997 fee guide. Over time, however, differences in dental fees across Alberta will manifest themselves.

As the fee guide begins to recede in the rear view mirror, forward-looking dentists will begin to set their own fees and review them regularly without consulting the 1997 edition of the fee guide. Many will likely consult the fee survey that the Alberta Dental Association plans to provide as a replacement to the former fee guide, and set their fees based on the provincial average.

Some Alberta dentists will likely opt for lower than average fees as a means of attracting price-conscious patients, and this tactic may

have some merit if it is part of an overall marketing strategy.

Other dentists will make the mistake of trying to hide in the middle of the pack. When fees are unregulated, there is a danger that average fees may fail to adequately distinguish the practice or, worse yet, signal to the public that the practice itself is only average. However, there will also be a group of dentists who boldly attempt to test the market's upper limit on fees.

The fee guide was developed using formulas that took into account the time, average overhead, and other factors required for each procedure. In the absence of a fee guide, dentists should move to a market-based approach for setting fees. Although this model still requires the break-even point to be known, calculating the profit (i.e., anything above the break-even point) is anything but an exact science.

Through a combination of clear communication with patients, attractive office decor, well trained staff and, of course, the ability to deliver excellent care and treatment, certain dentists will imbue the services they provide with enough perceived value that patients will pay a premium price. While it is true that a given patient could find another dentist to provide a similar course of treatment for a lower price, there are patients who will pay top dollar for what they consider to be high-quality treatment. In a free market, competition tends to keep prices in check, while imagination and boundless

self-confidence on the part of the entrepreneur push prices higher.

The demise of the fee guide means that there is no longer a floor below which fees cannot fall. On the other hand, there is also no longer a ceiling beyond which fees cannot rise. In this deregulated environment, there is no theoretical upper limit on a dentist's income. Even when the dentist's schedule is completely booked, there are opportunities to change the mix of services, treat fewer patients more comprehensively and, of course, raise fees.

Dentists who are working at full capacity should certainly raise fees, because the market is telling them that the demand for their services is outstripping their ability to supply those services. In turn, dentists who have gaps in their schedules should not necessarily lower fees, but try to attract more quality patients whom they can educate about the benefits of modern dentistry.

Still, there are dentists who put caution above good business, and display genuine reticence about

asking to be paid fairly for their considerable skills. To put the process of setting fees in perspective, I want to share one of my favorite stories about Picasso.

A woman was walking down a street in Paris when she recognized Picasso, the world-famous painter. On an impulse, she asked him to sketch her. In just a few minutes, the sketch — an original Picasso — was ready.

"How much do I owe you?," the woman asked.

"Five-thousand francs," he answered.

"But it only took you a few minutes," she politely reminded him.

"No," Picasso said. "It took me all my life."¹

Imagine a different scenario. Consider for a moment what would have happened if there had been a Parisian Artists' Fee Guide in Picasso's time. Picasso would have consulted the guide and asked for the going rate for a hastily sketched portrait — and he would have vastly undervalued and under priced his talents.

Dentists should not charge by the hour, but by their years of experience and their ability to achieve the desired outcome.

As dentists in Alberta and across Canada prepare to practice dentistry in the next millennium, they would all be well advised to have the courage to put aside impediments to free enterprise, such as the fee guide, and to let their practices soar to new heights. ■

David Schwab is a practice management consultant who provides consulting services and seminars to dental professionals throughout the U.S. and Canada. He may be reached by fax at (407) 324-1787 or by e-mail at 74147.233@compuserve.com.

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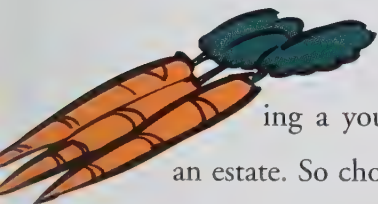
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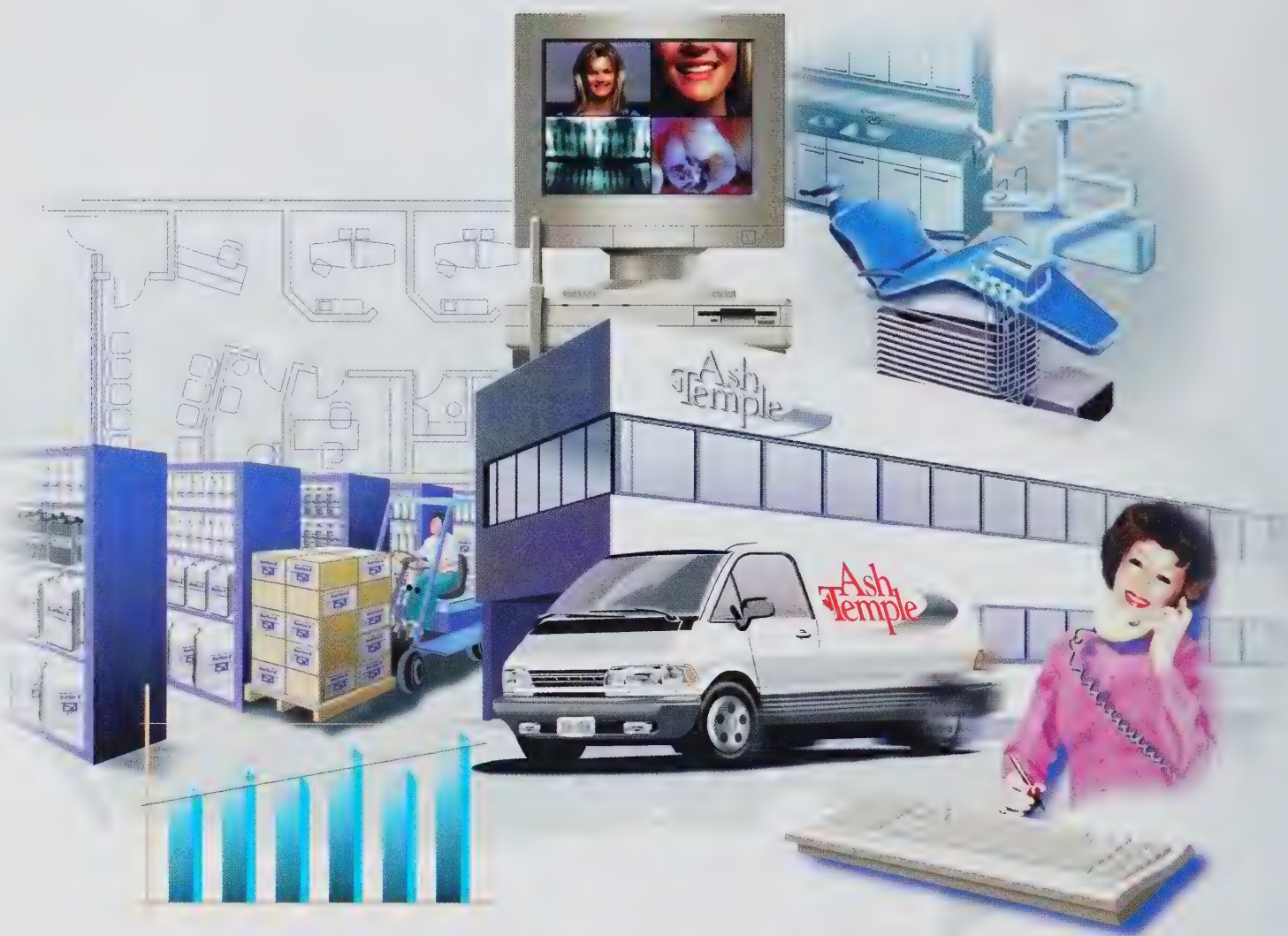


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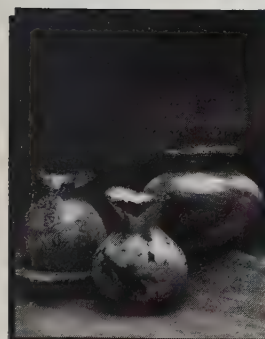
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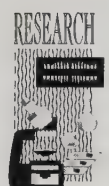
A selection of wood turnings by Dr. Samuel Lewinshtein.

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EDITORIAL

WHY IS CDA IN THE PUBLISHING BUSINESS?



Dr. John P. O'Keefe

I bumped into Erla Kay, Senior Publisher of *Oral Health*, at the Pacific Dental Conference in Vancouver in March. After exchanging the customary pleasantries, she thrust a large glossy magazine called *Vantage* into my hand, saying: "Have a look at a real dental journal."

Always willing to learn, I leafed through the colorful pages of the magazine.

"There's not much clinical stuff in there, mainly lifestyle articles," continued Ms. Kay. "What do you think?"

I thought for a moment, and replied: "For what it is, it's beautiful. But I don't really think it can be called a dental journal, *per se*."

Ms. Kay went on to tell me about her new U.S.-focused venture, editing the *Vantage* magazine. It was obvious that she was quite excited about her project, and I wished her well.

This encounter set me thinking about the nature of dental publishing, and what CDA's objectives are in publishing the *Journal*, *Communiqué*, and CDA Web site. It seems to me that we have at least five objectives for our publications.

We want to tell our members, and the profession as a whole, what CDA is doing for them, and

why we think that CDA is a worthwhile organization.

We hope to create a sense of professional community for all dental professionals in Canada.

We want to project a positive image of the Canadian dental profession to the Canadian public and to our fellow professionals in other countries.

We want to educate members of the profession on clinical issues and matters related to the business of dentistry.

We provide a forum for the publication of original work produced by members of Canadian dental faculties.

The first three of these objectives relate to improving the cohesion of the Canadian dental profession as it faces new challenges in the practice environment. In fact, the environment in which dentistry is practised in Canada is changing rapidly. I am concerned that Canadian dentists, who are so focused on providing the best possible care for patients, may not take adequate time to reflect on this rapidly changing environment and the profound impact it will have on our profession.

In my estimation, our profession faces three major issues as it heads into the new millennium: fragmentation, deregulation, and the undermining of public trust. As a self-regulating profession with a unique body of knowledge, we have a duty to adapt to our changing environment successfully, and to work toward ensuring that all Canadians enjoy optimum oral health.

Deregulation involves the expansion of the scope of practice of professional substitutes (e.g. denturists and hygienists). *Fragmentation* stems from the increasing alienation of certain segments of the profession from each other, perhaps because different groups within the profession see their interests as being specific or unique, and no longer served by an organization like CDA. Potential fault lines are: specialist - generalist; university-based academic - community-based practitioner; younger dentists - older dentists; and Canadian-trained dentists - foreign-trained dentists.

The public's trust in the profession may be diminished by television programs like the CBC *Marketplace* feature on dental fraud, which was broadcast March 31. These types of programs are a manifestation of the rise in societal consumerism — a phenomenon that will likely lead to more strident calls for increased external scrutiny of the profession (through public involvement in dental regulatory agencies, and the demand for more transparency in evaluation and discipline).

The cohesion of our profession seems to be decreasing at a time when the powerful "buyers of dental care" (large corporations and insurance companies) are merging and working cooperatively. Our publications have a more important role to play than ever before in building a sense of community in the profession as it adapts to this changing environment.

Objectives four and five concern our desire to help practitioners keep abreast of changes in the art and science of clinical dental practice. The *Journal* can have a unique place in the professional development of Canadian dentists if its scientific and clinical content is focused clearly on the objective of helping Canadian dentists to make better clinical decisions.

Our ability to make scientifically-based clinical decisions is what differentiates us from the practitioners of substitute occupations. I view dentists as "knowledge workers," to borrow a phrase that is much in vogue. Dentistry is a science-based discipline, and scientific research must be published in peer reviewed journals. The credibility and integrity of our *Journal's* peer review system is critical to our success as a publication dedicated to helping Canadian dentists make quality, science-based clinical decisions.

As the national unifying voice for the dental profession in Canada, CDA has a vital role to play in the dissemination of various types of important professional information.

John P. O'Keefe, Editor
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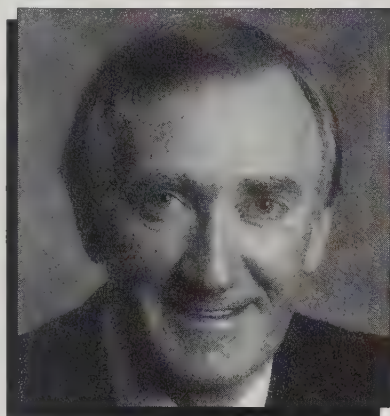
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THE POWER OF COMMUNICATION



Dr. Toby Gushue

One of the most important skills we need as dental practitioners is the ability to communicate effectively with our patients. It is our responsibility to help patients understand the state of their oral health, the treatment options available to them, and the home care techniques needed to maintain their oral health.

To be effective, dentist-patient communication must be a two-way exchange. We need to listen to our patients, learn their needs and expectations, and provide them with the information they require to make informed decisions.

The importance of proper dentist-patient communication was brought into focus by a recent *Marketplace* exposé on dental fraud. Although it attempted to portray the dental office as a place where consumers must be alert to the possibility of being improperly or fraudulently treated, the story may have revealed more about the need for clear, honest, unbiased and effective communication than anything else.

Marketplace, a CBC television prime time news program, focused its attention on an Ontario dentist accused of providing unnecessary treatment to a patient; a B.C. dentist found guilty of fraudulent billing; and the treatment plans presented to a CBC reporter who visited 51 different dental of-

fices across Canada carrying a hidden camera.

How, asked *Marketplace*, could 51 dentists come up with such widely divergent treatment plans for the same patient, with the same dental problems, unless some dentists were advising the reporter to accept treatment she didn't actually need?

But did the reporter communicate the same needs and expectations to every dentist she visited? And, since the dentists used in the *Marketplace* study were supposedly picked at random from the Yellow Pages, could they have had different skill levels and treatment focuses? Would a dentist who has limited his or her practice to restorative/cosmetic dentistry be likely to present a basic treatment plan or the ideal cosmetic treatment plan to patients? Did each dentist present just a basic treatment plan, just an ideal plan, or both?

At least one dentist has indicated that he presented both a basic "must do" treatment plan and an optional ideal plan to the reporter. When *Marketplace* contacted him about his treatment plans, he offered to explain them, but no one was interested in talking to him. Apparently, his message did not fit with the focus of the story *Marketplace* was intent on communicating.

One may wonder what stimulated *Marketplace* to do this story. A researcher for the program told me that its decision stemmed from an editorial by Dr. Randy Lang, published in *Oral Health*, which suggested that the increased supply of dentists, combined with a decline in the demand for services, was leading to an increase in dental claims fraud.

During the program, *Marketplace* advised viewers that CDA had refused to be interviewed. In fact, shortly after *Marketplace* began pulling together its dental fraud story, I was interviewed by one of the program's researchers, Ms. Christina Kuntz. I informed her that while CDA was aware that dental fraud does occur, we were not aware of any increase in the incidence of dental fraud. At the same time, I advised Ms. Kuntz that

CDA has no authority to investigate fraud cases, or to discipline dentists who have committed fraud.

At the conclusion of the interview, I advised Ms. Kuntz to contact the College of Dental Surgeons of British Columbia, and explained that B.C. has one of the lowest dentist-patient ratios in the country, that a member profiling system has been in place there for a number of years, and that if there were any indications of over treatment or fraudulent billing, it would show up in the College's profiles. I also advised her to contact the Canadian Association Of Dental Consultants, because if dental fraud was on the rise, they would be aware of it.

To CDA's knowledge, neither the B.C. College nor the dental consultants were ever interviewed by *Marketplace*.

In early March, CDA was asked to comment, in an interview intended for broadcast, on the treatment plans *Marketplace* intended to discuss during its dental fraud story. We informed *Marketplace* that CDA could not comment because the review of treatment plans is outside of our mandate, and because it would be inappropriate to do so without having examined the patient.

All of this is really about communication. Did *Oral Health* and Dr. Lang communicate the message they intended? Did the *Marketplace* reporter communicate her expectations in the same manner to each dentist? Did each dentist listen to the patient and hear the same message? Did each dentist communicate effectively with the patient when they presented their treatment plan? Was *Marketplace* truly unbiased, or was it intent on portraying the dental profession in a negative light?

Dentists currently enjoy the respect, trust and confidence of the public. Let us continue to earn their esteem by communicating effectively with everyone who visits our offices.

Toby Gushue, BA (Ed.), BA, DDS
President of the Canadian Dental Association

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LETTERS



The TMD Controversies

It is refreshing to note that somebody in the dental profession gave an honest and scientific evaluation of temporomandibular joints disorders and the appropriate treatment (Goldstein, B.H. The TMD Controversies. [It's My Opinion] *J Can Dent Assoc* 64:65-66, 1998).

When preparing my thesis on the temporomandibular joint at the University of Rochester in New York, I studied several post-operative and post-traumatic cases with cinefluorography, and found the results were satisfactory for a period of a year, or so, but that over the long term, dysfunction and pain set in. Most of the other cases of TM disorders did well on their own.

Manawel Araiche, MS, DDS
Binbrook, Ont.

CDSPI, The Disability Insurance Claim Process and You

In your March 1998 edition, Dr. Lawrence Gaum challenged me to "tell it like it is" (Gaum, L.I. CDSPI, The Disability Insurance Claim Process and You. [Letters] *J Can Dent Assoc* 64:158, 1998).

Dr. Gaum was referring to an article by Dr. Murray Chantler, which was published in the August 1997 edition of *Oral Health*. The answer to Dr. Gaum was actually printed in a special "CDSPI Edge Newsletter," which dealt with the second article by Dr. Chantler, and was sent to every dentist in Canada in January 1998. If any dentist did not read this newsletter or has misplaced it, you can obtain another copy by calling CDSPI and asking for one to be mailed to you.

By law, every long-term disability (LTD) claimant is entitled to confidentiality about his or her case, especially about his or her

personal medical and financial information, unless the claimant signs a release form allowing the insurance carrier to comment on his or her confidential claim file. Obeying the laws of Canada and Ontario, Sun Life does not reveal this confidential information to CDSPI or our staff unless there has been a signed release provided by the claimant. Dr. Chantler, like every other claimant, is entitled to this privacy.

Unless Dr. Chantler signs a release, CDSPI cannot comment on the details of his case because we are not privy to his confidential claim file. We simply do not know the details any more than you do. Unfortunately, Dr. Chantler chose to selectively reveal some of the details when he wrote the August 1997 *Oral Health* article, but not all of the details. Dr. Chantler is the only person who is able to authorize the public release of all of these details, and he has declined Sun Life's request to do so.

Dr. Gaum stated that he wants "to hear about the real thing and nothing but the real thing," and that he suspects his colleagues "feel the same." So do I, but by law this decision is up to Dr. Chantler, not CDSPI or Sun Life or myself.

On the positive side, I can tell you that 95 per cent of all the LTD claims are handled with few or no problems. Of the remaining five per cent, most are settled according to the contract that we, the dentists of Canada, have through CDA with Sun Life. In fact, most of these problem cases are resolved through the outstanding efforts of the CDSPI staff working with the Sun Life claims department staff. These claimants may not be entirely happy because they did not receive the answers or results that they wanted, but most of them do understand where the problems are and why.

I can promise Dr. Gaum and all the dentists of Canada that, if a release is provided by Dr. Chantler, CDSPI and Sun Life will gladly explain the other side of this situation. I can tell you that Dr. Chantler is currently receiving the full coverage benefits of his Canadian Dentists' Insurance Program LTD policy. Also, he is now employed

by a small insurance agency in the greater Toronto area. He is an insurance salesman who sells private LTD plans in competition with the Canadian Dentists' Insurance Program's LTD group plan, and earns commissions by doing so.

William G. Leggett, DDS
President and Chairman, CDSPI
Scarborough, Ont.

Why I Won't Renew My CDA Membership

Although I deeply respect the *Journal's* attempt to encourage discussion and dialogue within our profession, I am deeply disturbed by the comments made by Dr. Larivée concerning decisions that were taken during my presidency of CDA (Larivée, J. Why I Won't Renew My CDA Membership. [Letters] *J Can Dent Assoc* 64:159, 1998).

I have already written directly to Dr. Larivée and to the Order of Dentists of Quebec (ODQ), which saw fit to publish an even more biased version of her criticism of CDA in its journal.

I will try to be as objective as possible in responding to Dr. Larivée's allegations. Although she began her original letter by stating that she had always been an ardent supporter of CDA, she writes that she "even participated in a CDA campaign ...without charge." Now that is what I call commitment to the profession!

Dr. Larivée then proceeded to distort both the events as they occurred, and to use these fantasies to embark on her own political agenda of allegations.

The true facts are as follows:

1. Dr. Larivée's letter was the only letter or official comment received by CDA questioning the selection of the keynote speaker for the association's 1997 Convention in Calgary.
2. I took it upon myself to examine the transcripts of previous interviews with Diane Francis, which Dr. Larivée referenced in her letter, and the very serious allegations of racism made by Dr. Larivée.
3. I consulted widely with prominent French Canadians within and outside of the dental profession.
4. I had a conversation with the president and executive director



of ODQ, who did express some reservations about Diane Francis being CDA's keynote speaker after the fact, but only after being prompted by Dr. Larivée's letter.

5. Diane Francis had an impeccable C.V., and her topic was the Canadian economy and its relationship within the world.

6. More than 3,000 French Canadian dentists received the original announcement that Diane Francis would be the keynote speaker at CDA's 1997 Convention, and "Dr. Larivée's letter" was the only negative comment received in any form, even to this moment in time.

7. My polling clearly indicated that Dr. Larivée's comments did not reflect a prevailing opinion, and therefore no changes in the program occurred. However, a courteous reply to Dr. Larivée's letter was eventually drafted and sent out.

8. Dr. Larivée's comments regarding simultaneous translation and Convention speakers were totally without foundation. The details of simultaneous translation and speakers were discussed with the Quebec Dental Surgeons' Association, CDA's corporate member from Quebec, well in advance of the 1997 Convention in Alberta, and approved. In fact simultaneous translation was even provided for Diane Francis's presentation!

9. If Dr. Larivée did not receive as prompt a reply as she thought she was due, I apologize. It was not, however, the fact that "although the CDA president was from Quebec... he is an Anglophone" that caused the delay, it was simply because I was trying to run a solo practice, crisscross the country representing our profession on real matters of importance (amalgam, infection control, HIV, taxation, etc.), and trying to spend some quality time with my family.

The democratic policy decision that CDA made in regards to Diane Francis was obviously not good enough for Dr. Larivée and her personal agenda, as, six months after the 1997 Convention, she initiated a new series of correspondence, almost as a vendetta.

I find the comments made by Dr. Larivée in her second letter demeaning to our profession, the facts twisted to assert a political agenda, and believe that the reli-

gious beliefs of any member of a committee should have no bearing on discussions taking place within a professional journal.

In closing, my comments on this incident reflect the many calls I have received, and I am pleased to report that the majority of my francophone colleagues do not support the views of Dr. Larivée. Let us hope we can put this divisiveness behind us and concentrate on the truly serious issues facing our profession today.

*Barry Dolman, DMD
Immediate past-president,
Canadian Dental Association
Montreal, Que.*

I feel compelled to respond to Dr. Jacinthe Larivée's letter (Larivée, J. Why I Won't Renew My CDA Membership. [Letters To the Editor] *J Can Dent Assoc* 64:159, 1998) in which she expressed anguish over some issues related to the 1997 CDA Convention.

The writer's complaints involved the choice of Diane Francis as a guest speaker and the lack of French language lectures in the program. However, during her discussion of those issues, she extended her scope of criticism to include the association itself, our *Journal*, and all Canadians living outside of Quebec.

It is an interesting paradox that the whole tone of Dr. Larivée's letter bears out one of the alleged fallacies that she claims Diane Francis has fabricated relative to Quebec nationalists — namely that they are xenophobic. One does not require psychiatric credentials to sense at least a tinge of paranoia in Dr. Larivée's claim that "...Quebecers are more respectful of the sensitivities of Canadians than the other way around." It may come as a surprise to Dr. Larivée, but in greater Canada we regard Quebecers as Canadians also.

Concerning her specific complaints — the selection of Diane Francis was excellent. She is a nationally recognized author who, in her book, *Fighting for Canada*, put the Quebec separatist issue in clear focus without pulling any punches. The work is provocative as well as entertaining, but its contents have not been significantly discredited — at least outside of Quebec.

I am sure that the purpose in choosing CDA Convention speakers

is to acquire effective orators who will both inform and entertain. Ms. Francis certainly meets those criteria. We are not necessarily expected to agree with such speakers; we attend to merely hear their viewpoint on a significant topic. Roughly 87 per cent of Canada's total population actually believe that the threat of Quebec nationalism, as a destructive political force, is a very significant topic. But in defense of the *Journal*, this publication has always been decidedly apolitical and continues to be so. If letters are not published, it is because either the topic, the tone of the letter, or both, are not considered worthy. In a democratic society, editors must retain the right to accept or reject letters because that is an accepted responsibility of all editors. Only people suffering extreme ideological hypersensitivity would conclude that such a function amounted to "filtering information."

With regard to the language issue — CDA acted in a reasonable, democratic manner by catering to the vast majority of Canadians, including dentists, who use English as a language of choice, or are comfortably bilingual. English, whether or not it pleases francophones, is also the universal language of science and scientific publications. CDA need make no apologies for not having offered some of its program in French, because it is not the dominant working language of North America.

In summary — I see Dr. Larivée's letter as just another expression of the Quebec nationalists' perpetual dissimilarity quest — the more different they seem relative to other Canadians, the more justified are their separatist aspirations. Please do not allow such dissidence to politicize CDA.

*Donald F. Mulcahy, DDS
Edmonton, Alta.*

Because Ms. Diane Francis, an anti-separatist, was invited as guest speaker at a CDA Convention, Dr. Larivée has decided to punish herself by terminating her membership in CDA. I believe Ms. Francis will be unmoved by Dr. Larivée's decision. But CDA will be poorer and weakened by her absence. I am sure she will come to regret her hasty and ill-considered action.

Dr. Larivée's pride in her French-Canadian heritage is a

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normal and worthy emotion. I, too, have pride in my Jewish heritage. I was disturbed by the selection of Mr. Pierre Peladeau, who disliked the presence of Jews in business, as dinner speaker at a recent Les Journées Dentaires convention. This convention was sponsored by the Ordre des dentistes du Québec, the provincial regulatory authority. Unlike Dr. Larivée, I had no other choice but to remain a member and financially support this body if I wished to pursue my profession.

Dr. Larivée must realize this is not a perfect world. French-speaking Quebecers are responsible for the election to power of a separatist party, the Parti Québécois. The former leader of this party, Jacques Parizeau, blamed "money and the ethnic vote" for the loss of the last referendum on separation. As elected leader of Quebec, Mr. Parizeau's inflammatory statement was considered to represent the collective thinking of the French-speaking population. Why is Dr. Larivée intolerant of those who consider this abhorrent statement as "xenophobic, ignorant and fascist"? As educated health professionals, we are expected to face problems with an open mind; to have an understanding of human nature. I hope Dr. Larivée will reconsider her position and resist being persuaded by politicians and intolerance to "separate" herself and her practice from the rest of Canadian dentistry, i.e. CDA.

*D.J. Signer, DDS
Val-Deville, Que.*

Health Profession Or Beauty Business: What Direction Is Dentistry Taking?

I am curious what sort of response your editorial in the February 1998 issue of the *Journal* has elicited (O'Keefe, J.P. Health Profession Or Beauty Business: What Direction Is Dentistry Taking? [Editorial] *J Can Dent Assoc* 64:75, 1998).

I recently attended a C.E. lecture on "esthetic dentistry" in Vancouver where your editorial was circulated and people were encouraged to let you know that they strongly disagreed with your opinion. I think a better approach

would have been to circulate your editorial and allow dentists to form their own opinions.

Actually, I suspect and hope that most of the disagreement comes from misunderstanding. I think that the "esthetic" dentists believe your message is that promoting any esthetic dentistry is unethical and tacky. I suspect your real message is that dentistry must avoid the stigma of the "used car salesman" who make claims that cannot be backed up or are downright false.

In a broad view, all of dentistry is about selling, even a simple Class II restoration where the radiograph clearly shows caries to the DEJ. The difference is not in the selling, but the acceptance of the sales pitch. Most patients accepted long ago that when a dentist tells them they need a "filling," then it is in their best interest to listen. The sales pitch is no longer needed except in the case of the uneducated (or stubborn) patient who might argue: "Why do I need a filling? It doesn't hurt. I'll wait until it hurts. If that means I'll need a root canal, then I'll just have it pulled. It is only one tooth."

"Selling" or promoting crown and bridge treatment is more difficult, but is considered very ethical. The same goes for orthodontic treatment, and I feel a significant amount of ortho treatment is done for esthetic reasons. Many ortho patients have no TMJ problems and are fully capable of proper speech and mastication, yet we feel no guilt in recommending treatment. In the same light, I don't feel (and I suspect you agree) that we should feel guilty or cheap for promoting all of the fabulous results that dentistry is now capable of. No profession is ever discredited for showcasing its full potential. However, the decision of how important the appearance of the smile is should be left up to the individual patient.

The previous sentence has two meanings. First we should feel free to educate patients about what dentistry can do for their smile, so they can make an informed decision. Second, we should not go so far as to try to tell our patients how important their smile is to them. In other words, do not "sell" dentistry. We should promote what dentistry can do, but we should not attempt to tell the patient what is best for them. As

long as we can back up all of the claims we make to our patients, then dentistry will remain on solid (ethical) footing. There is nothing wrong with telling patients that we can whiten their teeth and close their diastemas. However, we must not tell our patients that whiter teeth and a lack of a diastema are the keys to their happiness (and financial security and a spectacular social life and Hollywood contracts etc.).

That's my opinion. Is that close to where you stand?

P.S.: I often shake my head when a "conservative, esthetic" dentist shows a case presentation where the solution to a midline diastema is eight veneers.

*Sean Kelly, B.Sc., DMD
Port Moody, B.C.*

Managed Dental Care

I note with great interest the articles being written by CDA and provincial associations regarding preferred provider organization dental plans. I am somewhat confused — on the one hand you are opposed to managed care plans, while at the same time provincial dental associations are entering into agreements with government departments (social assistance, Veterans' Affairs, etc.), which in my opinion are managed care plans. The department of social assistance dictates what treatment will be provided, how often it will be provided, and what fee will be paid. In Manitoba, they also dictate what type of materials will be used (e.g. cheapest teeth for dentures, only amalgams in posterior teeth).

Can you fault Blue Cross and other dental insurers for working toward making the same arrangements for treatment for their clients? If dental associations enter into managed care agreements for one group, then they should for all.

It is my opinion that we shouldn't be entering into agreements with any group.

*L.F. Matthews, DDS
Swan River, Man.*

Letters may be edited for space and clarity, at the discretion of the editor

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NEWS UPDATE

CDA Board Approves New Fluoride Supplementation Dosage Schedule

CDA has approved a new fluoride supplementation dosage schedule for Canadian children.

Although CDA's 1996 schedule and policy on fluoride supplementation gained wide acceptance in the Canadian health care community, a number of health care organizations, including the Canadian Academy of Pediatric Dentistry and the Canadian Pediatric Society, disagreed with the recommended fluoride supplementation dose for children under three years of age.



Dr. Benoit Soucy, CDA's manager, professional services

As a result of this disagreement, the Canadian Pediatric Society as well as some provincial and specialty organizations have been following the American Dental Association's 1994 schedule and fluoride supplementation policy.

The new schedule (**Table I**) was developed by the Canadian Consensus Conference On the Appropriate Use Of Fluoride Supplements For the Prevention Of Dental Caries In Children in an effort to create a single Canadian policy on fluoride supplementation, which will be used by all health care workers across Canada.

Based on the available scientific evidence, the conference recommended that health care workers should ask two key questions



Photo by Teckles Photography Inc.

A selection of wood turnings by Dr. Samuel Lewinshtein.

Cover Artist: Dr. Samuel Lewinshtein

Dr. Samuel Lewinshtein is an Ottawa dentist and wood-turner. A graduate of the University of British Columbia's dental faculty, Dr. Lewinshtein also holds a bachelor of science from McGill University. He was awarded a fellowship in the Academy of General Dentistry in 1984, and is a member of CDA and the Ontario Dental Association.

In his leisure time, Dr. Lewinshtein is a wood-turner. Working on a lathe, he creates beautiful objects such as bowls, vases, hollow forms and sculptural turnings made of wood. He uses a variety of local timber, including maple, yellow birch and cherry, and has a particular interest in "burls," which are irregular growths on tree trunks that display the remarkable beauty of the wood's grain.

A number of Dr. Lewinshtein's pieces have won prizes in wood-turning competitions. He considers wood-turning to be an extension of the art and science of dentistry. ■

before prescribing fluoride supplements to children:

1. Does the child brush his/her teeth (or have teeth brushed by parent or guardian) using fluoridated dentifrice at least twice a day? (If the answer is no, then topical fluoride exposure should be provided according to the fluoride supplementation dosage schedule

(**Table I**). If the answer is yes, then the answer to question two will determine the need for supplementation.)

2. In your judgment, is the child susceptible to high dental caries activity? (If the answer is no, then fluoride supplements are not required. If the answer is yes, then topical fluoride exposure should

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be provided according to CDA's 1998 fluoride supplementation dosage schedule (Table I.)

The main difference between CDA's 1996 and 1998 fluoride supplementation dosage schedules is in the recommended dosages for children under three years of age.

While the 1996 schedule recommended providing no fluoride supplementation to children under three years of age, the 1998 schedule recommends providing 0.25 mg of fluoride supplementation to children of six months to three years of age living in regions where the fluoride concentration in the drinking water supply is less than 0.3 parts per million.

In addition, while the 1996 schedule recommended providing 0.25 mg of fluoride supplementa-

Table I

Fluoride Supplementation Dosage Schedule

Age of child	Fluoride in water supply		
	< 0.3 ppm	0.3 - 0.6 ppm	> 0.6 ppm
0 - 6 months	none	none	none
> 6 months - 3 years	0.25 mg/day	none	none
> 3 years - 6 years	0.50 mg/day	none	none
> 6 years	1.00 mg/day	none	none

tion (0.5 mg if fluoridated toothpaste was not used regularly) to three-, four-, and five-year-old children living in regions where the fluoride concentration in the drinking water supply is less than 0.3 parts per million, the 1998 schedule recommends providing 0.5 mg of fluoride supplementa-

tion to children of three to six years of age living in regions where the fluoride concentration in the drinking water supply is less than 0.3 parts per million, if the answer to the two key questions justifies the use of fluoride supplements.

The board will consider the full list of recommendations emanating from the consensus conference when it holds its annual meeting in September. ■

Table II

Cardiac Conditions For Which Prophylaxis Is Or Is Not Recommended

Endocarditis Prophylaxis Recommended
<i>High Risk Conditions</i> a) Prosthetic cardiac valves, including bioprosthetic and homograft valves b) Previous bacterial endocarditis c) Complex cyanotic congenital heart disease (e.g. single ventricle states, transposition of the great arteries, tetralogy of Fallot) d) Surgically constructed systemic pulmonary shunts or conduits <i>Moderate Risk Category</i> a) Most other congenital cardiac malformations (other than above and below) b) Acquired valvar dysfunction (e.g. rheumatic heart disease) c) Hypertrophic cardiomyopathy d) Mitral valve prolapse with valvar regurgitation and/or thickened leaflets
Endocarditis Prophylaxis Not Recommended
<i>Negligible-Risk Category (no greater risk than the general population)</i> a) Isolated secundum atrial septal defect b) Surgical repair of atrial septal defect, ventricular septal defect, or patent ductus arteriosus (without residua beyond 6 mo) c) Previous coronary artery bypass graft surgery d) Mitral valve prolapse without valvar regurgitation e) Physiologic, functional, or innocent heart murmurs f) Previous Kawasaki disease without valvar dysfunction g) Previous rheumatic fever without valvar dysfunction h) Cardiac pacemakers (intravascular and epicardial) and implanted defibrillators

New Guidelines For Antibiotic Prophylaxis Approved

CDA has approved new interim Guidelines For Antibiotic Prophylaxis Of Bacterial Endocarditis For Patients With Cardiovascular Disease. (Tables II and III)

Adopted from the American Heart Association's latest guidelines, CDA's new guidelines are:

Objectives:

- Describe patient selection criteria — patients at risk;
- Describe indications for prophylaxis — procedures at risk;
- Outline other recommendations for treatment.

Patients at Risk:

Any patient presenting for invasive dental treatment with any of the cardiac conditions described in Tables II and III requires endocarditis prophylaxis.

The prophylactic regimens for dental, oral, respiratory tract, or esophageal procedures are presented in Table IV.

CDA's committee on community and institutional dentistry is developing additional recommendations pertaining to a number of other patient conditions, including the need for antibiotic prophylaxis for patients with different types of joint prosthesis. Its revised guidelines will likely be presented to the CDA board of governors for approval in September. ■

Task Force On Dental Education Submits Final Report

CDA's Task Force On Dental Education submitted its final report to the association's board of governors March 28, after nearly four years of work.

The mandate of the Task Force, established in October 1994, was: To identify issues and trends in dental education, to review their significance, and to present information conclusions and recommendations on the future of dental education in Canada to the CDA council on education.

Its report contains several key findings, as well as 18 recommendations directed toward a number of dental organizations, including CDA.

Notably, the task force report "notes with great concern" that dental education in Canada is currently being reshaped for fiscal reasons alone.

"In particular, the task force notes that the existence of the stand alone dental faculty is being challenged," states the task force in the introduction of its report. "Several universities have undertaken or have completed the process of integration of faculties of medicine and dentistry. The task force recognizes that there is a need for change within dental programs to meet the unique needs of dental students for the future. Fiscal constraint serves as a strong catalyst to achieve the change which needs to take place within dental education programs. The end result will be positive provided the needs of the dental graduate as an independent practitioner take precedence over economic considerations. The task force believes that the stand alone faculty is clearly capable of meeting the challenge of change. It also recog-

Table III

Dental Procedures For Which Prophylaxis Is Or Is Not Recommended

Endocarditis Prophylaxis Recommended*

- a) Dental extractions
- b) Periodontal procedures including surgery, scaling and root planing, probing, and recall maintenance
- c) Dental implant placement and reimplantation of avulsed teeth
- d) Endodontic (root canal) instrumentation or surgery only beyond the apex
- e) Subgingival placement of antibiotic fibres/strips
- f) Initial placement of orthodontic bands but not brackets
- g) Intraligamentary local anesthetic injections
- h) Prophylactic cleaning of teeth or implants where bleeding is anticipated

Endocarditis Prophylaxis Not Recommended

- a) Restorative dentistry[†] (operative and prosthodontic) with/without retraction cord[‡]
- b) Local anesthetic injections (nonintraaligamentary)
- c) Intracanal endodontic treatment; post placement and buildup
- d) Placement of rubber dams
- e) Postoperative suture removal
- f) Placement of removable prosthodontic/orthodontic appliances
- g) Taking of oral impressions
- h) Fluoride treatments
- i) Taking of oral radiographs
- j) Orthodontic appliance adjustment
- k) Shedding of primary teeth

**Prophylaxis is recommended for patients with high- and moderate-risk cardiac conditions.*

†This includes restoration of decayed teeth (filling cavities) and replacement of missing teeth.

‡Clinical judgment may indicate antibiotic use in selected circumstances that may create significant bleeding.

nizes that alternative administrative and organizational structures involving partnerships with other educational programs may prove as effective provided that the educational needs of the dental student are not compromised. It is important to note that high quality education is dependent not only on academic education but also reflects equally the availability of effective clinical education and the existence of a strong dental research program. Any one individual component cannot be sacrificed at the expense of another."

The recommendations of the task force are:

Recommendations Directed To Several Organizations

1. That all dental organizations place emphasis upon the need for government to recognize that oral health care is an essential primary care service and a vital component of overall health care, and:

- That the provincial government support for dental education and the associated dental services, general and specialized, provided through dental education be increased to reflect levels of support comparable to those provided for medical care and medical education.

Table IV**Prophylactic Regimens for Dental, Oral, Respiratory Tract, or Esophageal Procedures (No Follow-Up Dose Recommended)**

Situation	Agent	Regimen*
Standard generals	Amoxicillin	Adults: 2.0 g Children: 50 mg/kg PO 1 hour before procedure
Unable to take oral medications	Ampicillin	Adults: 2.0 g IM or IV Children: 50 mg/kg IM or IV within 30 minutes before procedure
Allergic to penicillin	Clindamycin	Adults: 600 mg Children: 20 mg/kg PO 1 hour before procedure
	or	
	Cephalexin [†] or Cefadroxil [†]	Adults: 2.0 g Children: 50 mg/kg PO 1 hour before procedure
	or	
	Azithromycin or Clarithromycin	Adults: 500 mg Children: 15 mg/kg PO 1 hour before procedure
Allergic to penicillin and unable to take oral medications	Clindamycin	Adults: 600 mg Children: 20 mg/kg IV within 30 minutes before procedure
	or	
	Cefazolin [†]	Adults: 1.0 g Children: 25 mg/kg IM or IV within 30 minutes before procedure

*Total children's dose should not exceed adult dose.

[†]Cephalosporins should not be used in individuals with immediate-type hypersensitivity reaction (urticaria, angioedema, or anaphylaxis) to penicillins.

- That dental internship/residency positions be supported by at least the same level of provincial government funding as medical internship/residency positions.
2. That adequate clinical education is a vital component of dental education and its provision must be justified, defended and preserved in the face of economic constraints and competing priorities.
 3. That tuition fees for students in dental education programs should more closely approximate costs and a system of scholarships, bursaries and loans should be developed to support access to dental education.
 4. That the Canadian Dental Association, provincial licensing authorities and organizations representing allied dental personnel cooperate to explore how new coordinated approaches to dental education can be developed. This coordination

should reflect how the members could work together in future in the oral health care system, while respecting the role of the dentist in comprehensive diagnosis and coordination of patient care.

5. That in order to assist dental education to respond to changing needs and to place greater emphasis upon the preparation of the future dentist with increased diagnostic skills, the National Dental Examining Board, Association of Canadian Faculties of Dentistry and the Canadian Dental Association Council on Education cooperate to revise the current "Association of Canadian Faculties of Dentistry Global Competencies for DDS/DMD Recipients."

6. That dental researchers in Canada address the need to develop data on oral health and on a wider range of diseases of the orofacial complex including health outcomes and cost benefit analyses

and cooperate in the extension of information systems regionally, nationally and internationally.

7. That licensing authorities, universities, government and organized dentistry address the dental human resource requirement and make appropriate recommendations to meet future needs.

8. That the Canadian Dental Association Council on Education and the Association of Canadian Faculties of Dentistry cooperate with other bodies as appropriate to undertake a national review of future needs for educational programs in the dental specialties.

Recommendations Directed To Provincial Dental Licensing Authorities

9. That provincial licensing authorities, in conjunction with dental educational programs, establish and implement a system to assess

and promote the maintenance of continuing competency of their members and cooperate with dental faculties to provide related educational opportunities (i.e. auditing dental classes, short duration hands-on clinical courses, etc.)

10. That provincial licensing authorities emphasize (in the process for approval for credit toward continuing competence) those continuing dental education programs that have a valid and reliable outcomes assessment.

11. That licensing authorities should consider the individual practitioner's actual practice when deciding what constitutes continuing competency for that practitioner.

Recommendations Directed To Dental Education Programs

12. That where provincial licensing authorities have established the need for remediation of a member, the dental educational programs cooperate to provide the necessary remediation opportunity.

13. That dental education programs continue to maintain lists of the competencies that graduates are expected to possess upon completion of the program and to demonstrate how these competencies are supported and evaluated within the educational programs.

14. That a process be established to consider the feasibility of regionalization of dental education in response to the need to maintain quality in dental education, patient care, and research.

Recommendations Directed To the Commission On Dental Accreditation Of Canada

15. That the Commission On Dental Accreditation Of Canada requirements stipulate that administrative structures provide a focus for dental education which can ensure that each of the following conditions can be met:

- The autonomy of dentistry as a primary care profession is respected.
- The unique needs of dental education are identified through due process, reflected in the educational programs' content and evaluation processes.



Dr. David Donaldson, chair of CDA's Council on education

- Faculty associated with the dental program are eligible for appointment to all relevant positions including any related interdisciplinary administrative positions.
- The concerns of students, faculty and administration in the dental education program can be directly expressed by their representatives in the senior administrative committees and forums of the university.

16. That dental education programs be required to demonstrate how components (from individual course offerings through laboratory, clinic, hospital/institutional and field experience) are related to the development of particular competencies that graduates are expected to possess upon completion of the undergraduate educational program.

Recommendations Directed To the Association Of Canadian Faculties Of Dentistry

17. That the Association Of Canadian Faculties Of Dentistry and the Canadian Dental Association's Council on Education, in cooperation with dental education programs, licensing authorities and government agencies, undertake the development of viable options to create increased pre-licensure clinical experience for all dental students/graduates by the year 2000 for national implementation in 2002.

Recommendations Directed To the Canadian Dental Association Council on Education

18. That the Canadian Dental Association in cooperation with the

Canadian Association For Dental Research lobby the federal government to provide additional financial support for the epidemiological studies required to expedite and assist planning for the future delivery of oral health care and for the development of educational programs preparing dental professionals who will meet the future dental needs of the Canadian population. ■

CDA To Adopt New Mission Statement and Goals

CDA is updating its mission statement and goals to place more emphasis on the association's role as the authoritative national voice, resource and focus of unity for the profession of dentistry in Canada.

During its March 27-28 interim meeting in Ottawa, CDA's board of governors approved revised wording for the association's mission statement and goals, which reflect the fact that CDA does not provide oral health care *per se*, and that it has a responsibility to the profession of dentistry that extends above and beyond its responsibility to individual members.

Once the required bylaw changes are approved by the CDA board and accepted by Industry Canada, the words "and provision" will be removed from the association's mission statement, which will read: "The CDA is the authoritative national voice, resource and focus of unity for the profession of dentistry in Canada, dedicated to meeting member needs, and the promotion of optimal oral health for Canadians."

Similarly, the wording of CDA's first goal will be changed to replace the words "its members" with "the profession of dentistry," and the wording of the second goal will be changed to include the words "with the provincial dental associations, colleges and regulatory authorities, national."

The association's new goals will be:

- To ensure that the association is able to identify and position itself on all subjects which are of importance to the profession of dentistry.



Dr. Toby Gushue

- To develop, with the provincial dental associations, colleges and regulatory authorities, national positions, policies and programs which will promote optimal, accessible oral health care for Canadians.
- To develop programs, standards and services at the national level, which will support the profession.
- To develop and maintain an effective national communications strategy and programs, to communicate with CDA publics and stakeholders on all matters within the mandate of CDA.
- To provide national forums which facilitate the exchange of ideas, and the development of positions and standards on issues of interest to dentistry.
- To ensure that the association has the necessary resources to effectively fulfil its mandate.

It is anticipated that the approval process will be completed in early 1999.

Much of the impetus to refocus CDA's mission statement and goals came from the joint planning event that the association held with its corporate members last September. During the day-long session, corporate members were asked to consider the question: "What does organized dentistry want CDA to do and be on its behalf." Their responses were subsequently reviewed and considered by CDA's executive council, when it held its annual fall planning session in November. ■

Fairness Should Be Paramount In New Tax Legislation — CDA Believes

CDA is communicating with Finance Department officials to promote fairness in the legislation being drafted to extend the tax deduction on health and dental plan premiums to self-employed, unincorporated Canadians.

"We are very pleased that Finance Minister Paul Martin extended the tax deduction on health and dental plan premiums to self-employed unincorporated Canadians in his 1998-99 budget. It is a positive move that will create increased fairness in the federal tax system," said CDA's manager, government relations, Mr. Tim Hines. "However, we believe that self-employed, unincorporated Canadians should be provided with the same opportunities to access tax-exempt health and dental care as incorporated Canadians currently enjoy."

Under Canadian tax law, there are no restrictions on the amount of health and dental plan premiums that incorporated Canadians can deduct from their income in a year. However, under the tax provisions outlined in the 1998-99 federal budget, self-employed, unincorporated Canadians will only be allowed to deduct \$1,500 of the premiums paid for a private health savings plan (PHSP) from their annual business income, and only \$750 for each of their dependents.

"We are questioning the government's rationale in putting a top-heavy restriction in place that only affects self-employed, unincorporated Canadians, when the goal of the new legislation, as stated by Mr. Martin, is to create increased fairness in the federal tax system," said Mr. Hines.

CDA would also like to be involved in the government's efforts to inform Canadians about the changes in the federal tax law regarding the deductibility of health and dental plan premiums, so that as many Canadians as possible use the deduction.

"The target market is very broad based," said Mr. Hines.



Mr. Tim Hines, CDA's manager, government relations

"Many self-employed, unincorporated Canadians operate small businesses or shops, in diverse industry sectors nationwide. CDA members could play a key role by making their self-employed, unincorporated patients aware of the deduction, and how to use it."

Legislation to extend the tax deduction on health and dental plan premiums to self-employed, unincorporated Canadians is currently in the preliminary drafting stage. CDA will continue communicating with Finance Department officials on specific elements of the legislation as it makes its way through the draft stage and into the House of Commons.

Mr. Martin's commitment to building increased fairness in Canada's federal tax system was confirmed in a recent letter he sent to CDA president Dr. Toby Gushue.

"We realized that the number of self-employed Canadians was growing; many operating unincorporated businesses. As you are fully aware, self-employed individuals owning an unincorporated business could not deduct premiums paid for their own supplementary coverage, while owner-operators of incorporated businesses received tax-exempt coverage through their business. This was unfair. This budget seeks to address this imbalance to better reflect the increasing role of self-employment in job creation. The move, starting this year, to allow unincorporated owner-operators to deduct premiums for supplementary health coverage

against their business income, to a maximum amount, is a significant incentive for 'oral health maintenance' for all Canadians," wrote Mr. Martin. ■

Dental Equipment Needed In Guatemala

A Canadian religious order is seeking medical and dental equipment to establish a health centre in Guatemala.

The Kingston, Ontario, based Sisters Of Providence Of St. Vincent De Paul needs a dental chair and light; equipment to provide restorations and extractions; a sterilizer; restorative and denture materials; equipment for the administration of anesthesia; surgical equipment; and toothbrushes to open the Integral Health Institute of Momostenango.

To be located in Barrio Patzité, the non-profit institute will offer low-cost health care services to the local Guatemalan population, "giving preference to the economically vulnerable, victims of armed conflict, the displaced, returned refugees, and the immobile."

The centre's objectives are to: offer efficient and economic medical attention to the people of the five municipalities of the department of Totonicapán; to consider a permanent emergency, medical, surgical and hospital service; to offer medication at a low cost; to put a laboratory and other diagnostic equipment at the disposal of doctors and patients; to offer a permanent ambulance service; to implement the rescue and development of traditional Mayan medicine; to generate sources of employment and opportunities for a dignified life; and to lower morbi-mortality rates prevalent in the region.

A full-time dentist will work at the centre, which will be open 24 hours a day, seven days per week, and serve a population of approximately 122,000 Guatemalans from a new, two-story, 13-room building.

Canadian dentists interested in contributing equipment, materials, or supplies to the centre

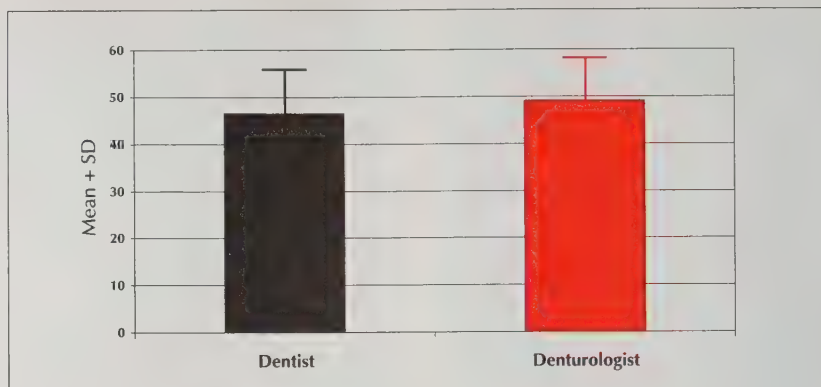


Fig. 1a: Subject age.

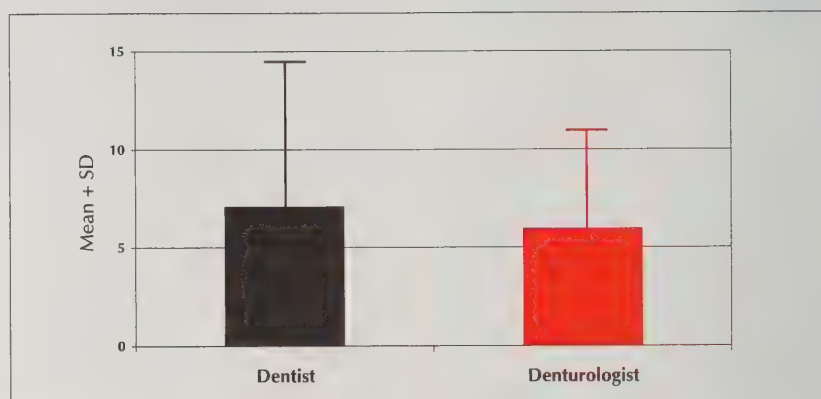


Fig. 1b: Prosthesis age.

should contact Mrs. Mary Lou Carroll at (613) 373-2166.

Mrs. Carroll is making arrangements to have donated equipment and supplies shipped from Canadian Forces Base Trenton to Guatemala in late June or early July, and has located a site where donations will be stored pending shipment.

The Sisters Of Providence Of St. Vincent De Paul have worked in Guatemala for more than 25 years. ■

Erratum

In the March 1998 issue of the *Journal*, in the article "Patient Satisfaction With Dentures Made by Dentists and Denturologists" by Drs. Chantal Morin, James P. Lund, Christine Sioufi, and Jocelyne S. Feine (*J Can Dent Assoc* 64:205-208, 210-212, 1998), there was an error in **Figs. 1a** and **1b** due to a printer error. As a result, the bar graphs did not accurately show the denturologist's information. Therefore, we are reprinting the corrected charts at the top of this page. The *Journal* regrets the error. ■

LIBRARY PACKAGE

CDA Resource Centre Package for May 1998

This package contains a selection of reading materials on CERAMIC CROWNS. It is available to members of CDA for \$5.00 plus applicable tax.

A complete list of packages is available upon request by calling 1-800-267-6354 or can be easily accessed on the CDA web site at www.cda-adc.ca. Once inside our site, please log into the "CDA Members" area and click on the "Library/Resource Centre" and a list of packages can be viewed.

New Acquisitions:

The following can be borrowed by CDA members.

Goldstein, C.E, Goldstein, C.E. and Garber, D.A. Imaging in esthetic dentistry. Quintessence, 1998.

Oral & Maxillofacial Surgery Clinics. Cutaneous and mucous lesions of the head and neck. V.10(1) Feb. 1998.

Rothman, S.L. Dental applications of computerized tomography: surgical planning for implant placement. Quintessence, 1998.

Smith, B. Planning and making crowns and bridges. 3rd ed. Mosby, 1998.

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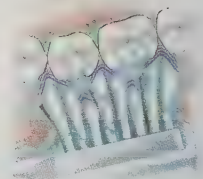
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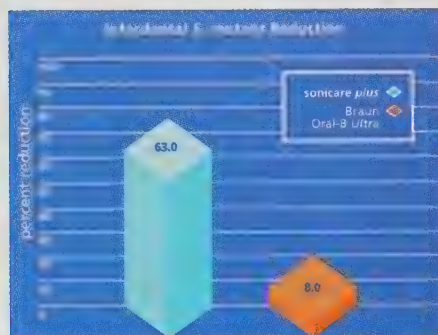
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1. Tritten CB, Armitage GC. *J Clin Periodontol.* 1996;23:641-648. (University of California, SF). 2. Ho HP, Niederman R. *J Clin Dent.* 1997;8:15-19. (Harvard University). 3. Imfeld, T, Senner B. *J Dental Res.* 1997. In Press. (University of Zürich). 4. Stanford CM, Srikantha R, Wu CD. *J Clin Dent.* 1997;8:10-14. (University of Iowa). 5. Brambilla E, Felloni A, Cagetti M, Gagliani M, Strohmer L. *J Dent Res.* 1997. In Press. (University of Milan). 6. Brambilla E, Felloni A, Cagetti M, Strohmer L. *J Dent Res.* 1998. In Press. (University of Milan). 7. Robinson PJ, Maddalozzo D, Simonson L, Breslin S. *J Clin Dent.* 1997;8:4-9. In Press. (Northwestern University). 8. Based on 14,783 survey respondents in the U.S.A.



The Changing Face Of Disability Insurance and How It Affects You

This special report was prepared for Canadian Dental Service Plans Inc. (CDSPI) by Sedgwick Noble Lowndes, a company specializing in the analysis of the insurance industry.

Of the many insurance plans offered to dentists as part of the Canadian Dentists' Insurance Program, the long-term disability (LTD) insurance plan is arguably one of the most important, because it protects an insured dentist against loss of income as a result of disability.

If a covered dentist develops a disability, that dentist could potentially receive benefits of thousands of dollars per month — tens of thousands per year — for up to 30 or 40 years. The total benefits payable for just one individual could be in the millions of dollars.

Clearly, it is important for dentists to have a good understanding of the conditions that will result in benefits being paid. To gain this insight, it may be helpful to look at how the disability insurance industry has been changing in recent years, and then to examine how specific cases would be handled under the Program's long-term disability insurance plan.

Growing Number Of Disability Claims Rocks Industry

Over the last few years, the claims experience record for long-term disability insurance has been increasingly poor throughout the insurance industry. This change has affected both individual and group (association) insurance product lines.

Where the normal expected incidence rate of new total disabilities (from the actuarial tables used

to determine premium rates) was in the area of 3.2 per thousand insureds in the 1970s and early 1980s, new total disabilities now occur at rates nearer to 10 incidences per thousand insureds.

The most frequently cited causes for this increase are: the rapid rise in claims due to "mental and nervous" and stress related conditions, "repetitive strain" (carpal tunnel) type disabilities and, to a lesser extent, AIDS.

In addition, dentists have been subject to higher than expected frequencies of back and vision problems, and job-specific problems such as allergic reactions to latex gloves. As a result, most insurance companies have downgraded dentists (or are in the process of doing so) from the top rate classifications previously used.

All of this has impacted considerably on the premium rate levels dentists pay for disability insurance, and on the availability of many disability insurance plan features and provisions.

Individual Disability Products Hit Hard Times

In the 1970s and early 1980s, the North American economy experienced double digit inflation and record high interest rates. During this period, individual disability insurance policies with level premiums guaranteed for the duration of the coverage became popular among professionals. Because

of the high interest rates earned on the excess premiums during the early years, insurers could set the premium rates for these plans at reasonably attractive levels.

The competition among individual insurance providers was fierce, and some very rich contract provisions were offered. For example, most individual policies would allow insureds to collect disability benefits without integrating other sources of income, resulting in some insureds being better off financially when on claim than they were pre-disability with their full taxable earnings.

When interest rates declined and the claims liabilities rose beyond expected levels, the guaranteed and non-cancellable individual product insurers suffered severe losses. They could not increase rates on their existing book of business, nor could they adjust overly generous features in those policies. While this was good news for the insureds, it resulted in a veritable sea of red ink, with continuing losses for the insurance companies most active in selling these policies.

As a result, those companies have greatly adjusted their guaranteed non-cancellable individual disability products by dramatically raising premiums and reducing benefits, or have left that market altogether. In addition, dentists have been downgraded out of the top rate categories, leaving them ineligible for certain attractive options and facing high premiums. In

fact, many dentists no longer qualify to get economical individual coverage, and in the U.S. it is now difficult for any dentist to get individual disability insurance.

Dentists' Own Group Plan Continues Serving You

In contrast, group (association) insurance plans have tried to keep to their stated purpose of protecting against the loss of income due to disability — not permitting an insured to profit from being disabled — which helped keep premiums low. So when interest rates declined and disability claims increased, group insurance plans could respond by increased premium rates and, to a lesser extent, fine tuning contract provisions, while still offering attractive plans.

The claims experience under the Canadian Dentists' Insurance Program long-term disability plan deteriorated significantly in the late 1980s and early 1990s, but unlike many private insurers, the Program — which is owned by the dental profession — did not abandon dentists. Instead, as of January 1, 1992, when the LTD plan was moved to The Prudential Group Assurance Company of England (Canada) (which was later acquired by Sun Life of Canada), premium rate adjustments were made to ensure that the plan offered the best combination of contract provisions and guarantees of continuing coverage for existing participants if it was ever discontinued.

The LTD insurance plan is experience rated, which means that any surplus is not kept by the insurer, but is returned to the plan for the sole benefit of the insured participants. (This feature resulted in a distribution of premium surplus back to participants in the mid 1990s, something that never occurs with private plans.) It also means that the claims experience tends to have a fairly direct bearing on premium rate levels and plan definitions.

Since the plan was moved in 1992, the claims experience has continued to be volatile, with total claims close to or exceeding the premiums paid to the insurer. This indicates that the 1992 rate adjustment was necessary.

In spite of the poor claims experience, since 1992 the premi-

um rates for the Program's LTD plan have been relatively stable. Smoker/non-smoker rates in 1994 raised the combined premium about three per cent. The introduction of male/female rates in 1995 redistributed premiums among individuals, but did not increase the total premium collected. Basic rates were increased by five per cent for 1997. However, a decision was subsequently made to maintain rates unchanged in 1998 and concentrate on contractual provisions. The "own occupation" option was maintained (an option that is not available through some private insurers).

The fine tuning of the LTD plan's contractual provisions and definitions for 1997 and 1998 was in line with changes that have been introduced industry wide. The most significant of these were the changes in the definitions of earned income and regular occupation/own occupation.

The Program's LTD plan was originally designed to insure the loss in dental income only, and not other sources of earned income. But dentists in Canada have increasingly diversified their incomes and daily activities to generate income, which was not necessarily reflected in their amounts of insurance under the Program's disability plan.

To address this change in economic environment, the definitions were enhanced so that other earned income was also insured under the plan. This change provided added protection for dentists, and was consistent with the fact that covering all pre-disability earnings has been standard practice throughout the disability insurance sector for many years.

For insured persons engaged in the practice of dentistry, the pre-1998 earned income and regular occupation definitions only concerned income from personal services in the practice of dentistry. However, for 1998 these definitions were changed respectively to include "salary and any other income earned from any source for services performed" and "any other occupations carried on or engaged in ... immediately prior to becoming disabled."

How claims work under the revised definitions is best illustrated by examples. The following examples and calculations, prepared by the plan insurer Sun Life of Canada, don't encompass all possible situations. However, you can compare them to your own situation to gain an understanding of how your benefits would be calculated should you ever become disabled. (In all cases, it is assumed that the premiums for coverage were paid with after-tax dollars, which will result in benefits being non-taxable.) These examples also reflect the broader new definition of regular occupation/own occupation as it applies to pre- and post-disability occupations.

Example #1: A dentist is a sole proprietor with a general dentistry practice. He becomes totally disabled from a severe shoulder fracture. His pre-disability monthly income is \$9,167, net of expenses and before tax. He has \$4,500/month coverage under the long-term disability insurance plan offered by the Canadian Dentists' Insurance Program.

The dentist hires an associate who generates \$10,000 net of expenses before tax per month. Their agreement is that the disabled dentist and the associate will split the money evenly.

The dentist will receive a \$4,167/month total disability benefit from the plan. This figure arises from the fact that his income has dropped from \$9,167/month to \$5,000/month, and the difference of \$4,167/month is covered by his insurance. His total disability benefit of \$4,500 is reduced by \$333 to take into account the income he receives from the associate.

Since the plan is designed to protect against a loss of income due to disability, it will not pay a benefit which would result in an increase in income for the dentist after his disability. However, while the dentist's pre-disability income was all taxable, his insurance benefit will be non-taxable, which could offer a major advantage depending on his tax status.

Example #2: A dentist is an orthodontist in partnership with two others. She becomes totally disabled due to deteriorating eyesight and is unable to ever return to

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CDA Fund Performance[†] (for period ending March 31, 1998)

CDA GROWTH FUNDS	1 year	3 years	5 years	10 years
Canadian				
Aggressive Equity Fund (Altamira)	24.0%	21.8%	n/a	n/a
Common Stock Fund (Altamira)	14.7%	11.9%	10.6%	9.4%
Canadian Equity Fund (Trimark) ^{††}	10.0%	15.6%	14.9%	12.8%
Special Equity Fund (KBSH)*	42.3%	40.2%	32.4%	n/a
International**				
Emerging Markets Fund (KBSH)	-18.6%	-7.3%	n/a	n/a
European Fund (KBSH)	35.6%	24.3%	n/a	n/a
International Equity Fund (KBSH)	14.3%	12.4%	n/a	n/a
Pacific Basin Fund (KBSH)	-3.2%	4.1%	n/a	n/a
US Equity Fund (KBSH)*	40.7%	27.1%	20.6%	17.7%
Global Fund (Trimark) ^{††}	20.1%	18.1%	19.4%	17.4%
CDA INCOME FUND				
Bond & Mortgage Fund (Canagex)	8.6%	10.5%	8.8%	10.0%
CDA CASH AND EQUIVALENT FUND				
Money Market Fund (Canagex)	3.2%	4.6%	4.8%	7.2%
CDA GROWTH AND INCOME FUND				
Balanced Fund (KBSH)	17.3%	15.9%	12.2%	10.7%

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historical rates based on past performance and are not necessarily indicative of future performance.

^{††} The rates of return shown for the Canadian Equity Fund (Trimark) and the Global Fund (Trimark) are based on the returns of the Trimark Canadian Fund and the Trimark Fund respectively, the mutual funds in which those CDA funds invest. Returns are historical and are after deduction of management fees. As a result, the performance results differ from those published by Trimark Investment Management Inc.

* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

** These funds are subject to foreign content limitation.

For current unit values and GIC rates call CDSPI Toll-Free at 1-800-561-9401, ext. 525 or visit the CDSPI website at www.cdspi.com.



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dentistry. She sells her share of the practice to her partners and becomes a successful real estate sales agent earning \$200,000 a year. Her pre-disability income was \$24,000/month net of expenses before tax, and she has \$8,000 monthly benefit under the Program's disability plan, with the own occupation rider. She has no coverage from any other carrier.

The dentist will receive the monthly tax-free benefit of \$8,000 under her plan, regardless of the income generated from her real estate occupation, because she has the own occupation rider and she was not working as a real estate agent prior to her disability. (If the orthodontist had not purchased the own occupation rider, the income from her real estate job would be considered in the calculation.)

Example #3: A dentist practises periodontal dentistry and earns \$300,000 annually (\$25,000/month) net after expenses but before income tax. He also invests in a software company, and earns \$50,000 per year in dividends from his investment. He purchases \$8,400 of monthly coverage from the Program's disability plan.

The dentist suffers a serious head injury in a skiing accident and is totally disabled for a period of time. During this time he re-

ceives the full \$8,400/month of tax free disability benefits. Since he is a passive investor in the software company and does not actively participate in its operation, the money he receives from that investment is deemed unearned income and has no effect on his insurance benefit.

The dentist slowly recovers, but is only able to work part-time in his practice. From his part-time work he earns \$6,500/month, net after expenses but before income tax. The dentist is considered "residually disabled," and therefore qualifies for partial benefits. His loss of income is now 74 per cent of what his income was before the accident, so he receives 74 per cent of his \$8,400 covered amount, or \$6,216/month in tax free benefits.

Example #4: A dentist practises general dentistry four days per week. He owns a potato farm and is actively involved in running the farm for three days per week. His annual income from dentistry is \$100,000 net of expenses before tax (\$8,333/month), and he earns \$50,000 net of expenses before tax from the farm (\$4,167/month), for a total of \$150,000 annually (\$12,500 per month). Based on this income, he purchases \$6,200 of monthly benefit from the disability plan.

The dentist has to stop practising dentistry when he becomes disabled due to a benign essential tremor, but continues to work actively on his farm and receives farming income of \$4,167/month net of expenses before tax. Since his pre-disability occupation was dentist/farmer and now he can work at only part of that occupation, he is considered residually disabled.

As a result, he qualifies for residual benefits, in a similar way to the dentist in example three who was working part-time. His loss of income is 67 per cent, so under the residual disability benefit he receives 67 per cent of the \$6,200 monthly benefit, or \$4,154 (tax free).

Now suppose that when the dentist originally purchased the \$6,200 of monthly benefit, he was not involved in farming, but was practising dentistry full-time and earning \$150,000 annually (\$12,500/month) net of expenses before tax. Only later, before he became disabled, did he take up potato farming and change his sources of income to the figures mentioned above. Would this make a difference to the benefit he would gain after he became residually disabled?

The answer is no. The disability insurance covers the dentist's income from whatever occupation he is employed in at the time of disability, so the calculation remains the same. Of course, if he did not take up potato farming until after he was disabled, his loss of pre-disability income would be 100 per cent. The disability benefit would be the full \$6,200 and the new potato farming income would not reduce the benefit, provided the dentist had the own occupation rider.

Review Your Coverage

Clearly, how much of your disability benefit you will receive if you become disabled depends on your particular income situation both before and after your disability. Because dentists participating in the plan now also insure their current non-dentistry earnings, those with earned income from outside dentistry should carefully review their amounts of disability insurance to ensure they have the right amount of coverage. ■

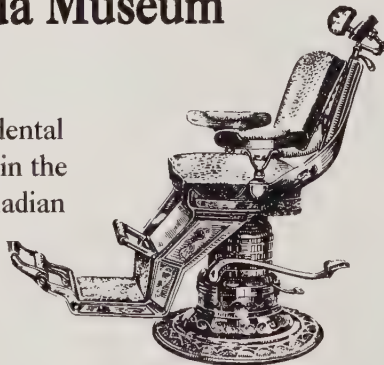
Dentistry Canada Museum

Donations Requested

Memorabilia from our rich dental heritage are now on display in the Resource Centre at the Canadian Dental Association headquarters and the Dentistry Canada Museum in downtown Ottawa.

Donations of museum quality dental artifacts and documents are being accepted and are very much appreciated. Items of value may be eligible for tax receipts.

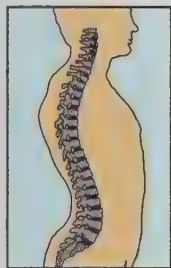
For further information on how you may participate in contributing to our rich dental history, contact Dr. Ralph Crawford, Dentistry Canada Museum, 427 Gilmour St., Ottawa, ON K2P 0R5, (613) 236-4763, fax (613) 236-3935.





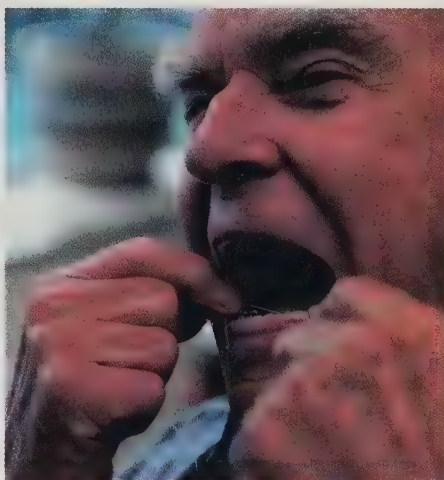
NUTRITION BITES

The hip bone's connected to the... mandible?



Periodontal disease and osteopenia leading to osteoporosis share a variety of predisposing risk factors, including nutritional deficiencies, smoking, increasing age, and corticosteroid use.¹ While numerous studies have sought to define the relationship between the two, the results have often been difficult to interpret due to such factors as small sample sizes; the lack of uniform methods of assessing osteopenia, oral bone mass and periodontitis; the lack of adequate control of confounding variables; as well as varying outcome definitions. Nevertheless, the majority are supportive of a significant role of osteopenia in establishing periodontal disease,^{1,2} perhaps because the loss of alveolar bone mineral content increases host susceptibility to periodontal bacteria, which then increases gum detachment and the risk of edentulousness. Recently, findings from the first large-scale assessment of the relationship between bone metabolism and oral health was reported

in Philadelphia.² Researchers at the University at Buffalo compared bone mineral density (BMD) and oral health in 2,599 postmenopausal women, participants in the National Health and Nutrition Examination Survey (NHANES) III, conducted between 1988 and 1994. Basing their analysis on measurements of hip BMD (via dual-energy X-ray absorptiometry), attachment loss (i.e., pocket depth between tooth and gum), and the



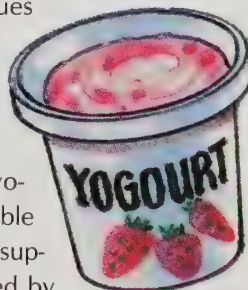
Serious public health concerns, osteoporosis and periodontitis result in pain and suffering for millions of aging Canadians, to say nothing of the serious financial burden they exact on society.

number of missing teeth, the investigators concluded that bone loss is directly associated with gum detachment and tooth loss.² Lead investigator Jean Wactawski-Wende, Ph.D., reported that for every 200 mg decrease in BMD, the team found an 86% increase in attachment loss and 32% increase in tooth loss.² Women whose BMD was two standard deviations from the norm (representing a loss of about 200 mg of bone) had an 86% increased risk of periodontal disease.² This study corroborates a pilot study of 70 postmenopausal women (mean age 63 years) that demonstrated a clear relationship between osteopenia and alveolar crest height and tooth loss.¹ Such findings posit an interesting symbiosis: if it is, in fact, confirmed that people diagnosed with periodontal disease may be showing signs of underlying bone loss, a routine dental X-ray may become a viable screening method for osteoporosis. At the same time, osteoporosis prevention and treatment methods, such as substantial calcium intake, might also help combat oral bone and tooth loss.

Say Yes to Yogourt

Milk, despite its sugar content, does not cause dental caries and may, in fact, help protect against them.^{3,4} The explanation may be that lactose is less likely to cause caries than other sugars,⁵ and several of milk's other components – e.g., calcium, phosphate and milk protein – are protective.⁶ While few studies have focused on the cariogenicity of yogourt, there is some evidence that it may be unlikely to cause tooth decay,^{6,7} regardless of speculation that yogourt's

acidic nature (pH<4) may precipitate dental erosion. Using bovine enamel slabs, Rytömaa and colleagues investigated the erosive capacity of a variety of foods and demonstrated that after four hours incubation at 37 °C, strawberry yogourt had caused no discernible erosion.⁶ These results were supported in 1994 by a study led by Millward that failed to show significant differences in yogourt consumption among groups of children with different

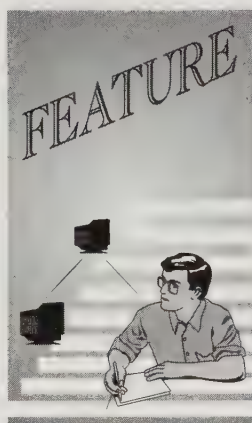


levels of dental erosion.⁷ While the reasons are inconclusive, it is probable that the high concentration of anticariogenic substances in yogourt more than offset any potentially detrimental effects caused by its acidity. Since it is highly nutritious and unlikely to precipitate gastric discomfort even in lactose-intolerant individuals, the fact that yogourt (without added sugar) is safe for teeth is just one more reason to recommend it.

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A Ukraine Odyssey

Gordon Nikiforuk, DDS, M.Sc., FRCD(C)

As the Lufthansa flight pierced the heavy industrial air of Frankfurt, climbing above the clouds on its way to Kiev, my thoughts focused on the people and land of Ukraine.

I had never been to an Eastern European country, and could not help but anticipate what lay ahead in a nation that was dominated by a highly centralized, autocratic regime for 70 years before becoming a fledgling democratic republic in 1990, and is the ancestral home of my forefathers. What would the historic capital city of Kiev be like and, more important, how were people coping in the difficult transition period? And why was I going to Ukraine now — as several neighboring passengers on the flight enquired?

Background

Ukraine is a land of great potential in both human and natural resources. Its population of over 52 million is well educated, it is rich in agricultural resources, and it has a strong industrial base. However, it also has a struggling economy and an infrastructure that is in need of major repairs.

With the collapse of the USSR, Ukraine is proceeding on an uncharted transition road that should bring it to the point of being a democratic, independent, sovereign nation with a market-based economy. But there is no Marshall

style plan available to assist the new republic, and reaching its intended destination will be difficult and often painful.

Fortunately, Ukraine's reform program is receiving some backing from the International Monetary Fund, and in 1992 the Canadian Society for International Health initiated the Partners in Health (PIH) program to promote democratic and economic reforms in Ukraine.

PIH is encouraging interactive linkages between health professionals and their related institutions in Ukraine and their counterparts in Canada. The projects currently under way encompass health administration, health education and promotion, epidemiology, mental health, nursing, communicable disease control and medical education, including its oral-dental (stomatological) aspects.

The First Day In Kiev

I landed in Kiev as a participant in the PIH program, along with Dr. Mary Kudrac, the manager of oral-dental health services for Toronto's public health department. On the first day, our hosts kindly helped us to explore Kiev. While I was prepared for many eventualities, I was surprised by the panoramic beauty of the historic city and the adjacent countryside.

By the 11th century, Kiev was one of the largest centres of civilization in the Christian world, boasting over 400 churches,

50,000 inhabitants, and wide commercial links to the Vikings and Greeks. Since then it has endured a long period of feudal wars, Tartar-Mongol rule for almost a century, Polish and Lithuanian occupancy, a liberation by a Ukrainian Hetman, and a long period of domination by Russia. But in spite of these travails, the city exudes a beauty characterized by its wide, tree-covered boulevards, the majestic Dnipro River, its botanical gardens, and its historic monuments and cathedrals.

The Mission

Our goal was to act as a catalyst to begin the process of creating linkages between health professionals and health-related institutions in Ukraine and their counterparts in Canada. We were to visit three areas: Kiev, Odessa, a major port in the Black Sea region, and Lviv, the most western province.

Our hosts, Dr. Nekrosova, Dr. Levitska and Dr. Holubiatnykov, who had previously visited Canada, discussed the specific topics that would be covered during our visit. Dr. Kudrac's presentation dealt with various aspects of dental practice relating to dental auxiliaries, sterilization procedures, office management and institutional care. My primary presentation focused on preventive dentistry, with a specific emphasis on the determinants behind the dramatic decline

of dental caries in the industrialized world, and on how to implement preventive programs in Ukraine. The role of the government, the private sector, and insurance programs in the delivery of health care were also stressed.

The Highlights

In Ukraine, dentistry (or stomatology) is a specialty of medicine. Five years of study followed by a year of internship are required to obtain a degree, and graduates are assigned to regional clinics at a salary of about \$40 per month. Unlike Canada, postgraduate specialty programs are not offered in Ukraine, but practitioners may obtain specialty status by pursuing an apprenticeship program, followed by a qualifying examination.

Professional organizations as we know them do not exist in Ukraine. The regulation of practice, delivery of services, and administration are under the control of the political bureaucratic system. Oral-dental services are universally accessible and largely free, with the exception of the care provided in the private clinics that are starting to open.

Our first visit was to a stomatological centre in Kiev. The large, well equipped and administered clinic was a paradigm of the new capitalism. Only patients who could afford the private fees were able to attend the clinic for services, which makes it an anomaly in Ukraine's current system of publicly financed clinics.

We subsequently found that Ukraine's public and school clinics are staffed by well educated and very dedicated personnel. The basic and technical know-how of the staff is impressive, although their armamentarium lacks new technologies, including different fluoride regimens to implement major preventive programs, or modern restorative materials employing bonding principles.

Controlled water fluoridation is not available in Kiev or Lviv, and natural fluoridation is sparse. But in spite of the drawbacks, the patients we observed were well cared for.

In general, the population's dental condition is similar to the condition of the Canadian population in the 1960s, before the intro-



Fig. 1: A stomatological clinic in Kiev. Note the use of a belt-driven handpiece. Air rotors are a priority item, at present.



Fig. 2: The staff of a well equipped stomatological clinic in the Odessa area that services a large naval barracks.

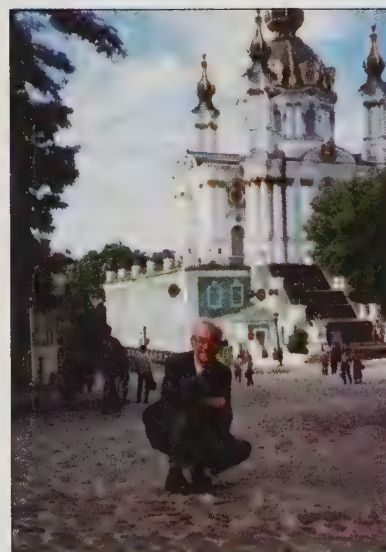


Fig. 3: The famed St. Sophia Cathedral in Kiev, built in 1037 by Prince Yaroslav the Wise to commemorate the victory over Asian nomadic tribes.

duction of fluoride therapies. According to our Lviv hosts, 83-86 per cent of the population in Ukraine is in need of dental treatment. Dental caries is rampant (about 90 per cent of children have dental caries), it is difficult to implement dietary and nutritional programs, and health promotion is not always a priority. Periodontal disease is common, and edentulism is often the rule in the elderly. Practitioners, of necessity, must give a high priority to treating the ravages of disease, with an emphasis on palliative care.

My objective was to underscore the fact that dental caries is declining in many parts of the

world, and to emphasize that a program of prevention deserves the highest priority.

There is no shortage of professionals in stomatology in Ukraine, and their number per capita is much greater than in Canada. This may be one reason why the use of dental hygienists and other auxiliaries is virtually non-existent to date. However, the training of hygienists and other auxiliaries is now receiving priority.

Deficiencies in the system were obvious. Despite this, I was impressed by the knowledge and skill of Ukraine's practitioners and academics, who work under stressful circumstances and often





with outdated technologies. But even in this rather difficult scenario, I could not help but feel buoyed by the spirit of the people I met. They are patiently and confidently waiting for the political and economic climate to improve. The standards of living and health care will concomitantly rise.

The Lessons Learned

This assignment was one of the most challenging of my lengthy career, but also one of the most rewarding. Ukraine is in a significant historical transition period, and is experiencing many trials and tribulations at the economic and political level. Nevertheless, what stands out in my mind is the indomitable spirit of the people, their resilience, humor and determination. Their hospitality during our visit was also touching. After the traditional meal and drinks (vodka, of course), I enquired how it was possible for such an economically deprived people to be so hospitable. The reply was simple and direct: "That is our priority."

Perhaps the essence of the many discussions that took place during our visit can best be summarized by the remarks of Dr. M. Pavlovsky, the rector of the Lviv Medical Institute, who asked us to give assistance that will let the Ukrainians help themselves: "Do

not send us out-moded equipment or medicines with expired dates."

In a discussion with medical officers, we learned that the three major medical problems in Ukraine are neurological conditions, cardiac conditions, and cancer. The neurological conditions were related to the difficult economic, social and political situations in the country. We were told that there are too many physicians (including stomatologists) in Ukraine, and that preventive programs, including public health education, must receive a higher priority.

Ukraine teaches us that the cardinal determinants of health inhere in the social, economic, educational and political aspects of a country. We learned that health improvement in Ukraine, as well as in Canada, will depend less on medical breakthroughs and more on the environmental and the lifestyle choices we make. The Ukrainians know this, and are asking for understanding and assistance in order to help themselves. I hope we were able to help them take this initial step in relation to oral-dental health.

The highlight of our two week odyssey was the soul and spirit of the people we met — the same spirit that has pulled them through many past adversities. Perhaps this is why our hosts were able to draw

similarities between their current plight, and the trials and tribulations of the early Ukrainian pioneers who came to Canada and helped to develop our country. In this sense, our discussions generated hope and confidence in Ukraine's future.

Ukrainians have embarked on a road they have not travelled on before — one leading to both independence and democracy. The transition to a democracy will be slow and even painful, but it will occur. One can sense a commitment of a free people to a new and fairer society based on equality of opportunity, devoid of the political patronage that was characteristic of past regimes. Equally important, as we were often reminded, the bribes and economic inequities that plague Ukraine's evolving society must be eliminated. The new Ukraine must be better than the old.

In one of the last conversations we had in Ukraine with Dr. Christina Levitska, the chief stomatologist of Lviv, I asked how the country hoped to manage the transition from a 70-year autocracy to a new democracy. Her reply was realistic and at the same time optimistic: "We will have to grow a new brain and that will take a generation."

As an old saying goes — "when all is gone there is always hope."

And so I left Lviv for a brief sojourn to a province in Western Ukraine called Horodenka, in search of my ancestral roots. But that is another story. ■

Acknowledgments: I gratefully acknowledge the assistance and generosity of our hosts in Ukraine: Dr. Lubov S. Nekrosova, deputy minister of health and principal epidemiologist of Kiev; Dr. Christina S. Levitska, head doctor of the first stomatological clinic, Lviv; and Dr. Mykola Holubiatnykov, chief, medical services, Illiachivsk, Ukraine. Also, grateful thanks to Ms. Paulette Schatz, program manager for the Canadian Society for International Health, Partners in Health Program for facilitating the administrative aspects of the visitation.

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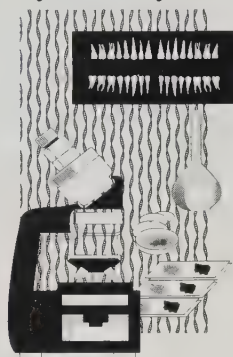
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RESEARCH



Interim Storage Of Avulsed Permanent Teeth

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ABSTRACT

This literature review examines the effects of extra-alveolar duration and storage conditions on the healing of the periodontal ligament (PL) of avulsed teeth following replantation. A critical assessment of the so-called "reconstitution theory" for PL cells is also presented.

The ideal treatment for an avulsed tooth is immediate replantation (i.e. less than five minutes). Unfortunately, immediate replantation is not the norm, and most avulsed teeth experience delayed replantation.

The greatest risk to the vitality of the PL cells attached to the root of an avulsed tooth is desiccation. Not surprisingly, storage media affect PL healing. Storing avulsed teeth in an isotonic liquid is superior to dry storage. Numerous studies support the use of Modified Eagle's Medium, Hank's Balanced Salt Solution (HBSS), ViaSpan, saline, milk, and saliva as storage media. A recent study has suggested that chicken egg white may also prove to be a suitable storage medium for avulsed teeth.

Of these media, only saliva is always present at the scene of an accident, however. Milk can usually be obtained on short notice, but even 10 minutes of desiccation can affect the outcome of replanta-

tion. From a practical standpoint, milk packed in ice seems to be the best alternative for the temporary storage of avulsed teeth, due to its wide availability and the minimal detrimental effects it has on PL cells. There is no evidence to support the suggestion that HBSS or any other media will "reconstitute" the PL cells when the extra-alveolar duration of avulsed teeth is greater than 30 minutes.

Key words: avulsion, dental trauma, storage media, tooth replantation, management

Introduction

The ideal method of managing an avulsed permanent tooth is immediate replantation.¹⁻³ However, due to accident-associated factors such as the person's emotional state, a lack of knowledge concerning proper first-aid treatment, a lack of confidence in the bystanders at the accident location, and informed consent issues, immediate replantation continues to be the exception.⁴ As a consequence, avulsed teeth often endure an extra-alveolar interval prior to replantation. Delayed replantation is therefore the only option by the time a patient arrives at a dental office.^{3,5-9}

The definition of immediate replantation was recently changed from "within 30 minutes of avulsion" to "within less than five min-

utes of avulsion."^{5,7} Periodontal ligament (PL) healing, the preferred outcome for replanted teeth, is largely dependent on both the duration of the extra-alveolar period and the storage conditions of the avulsed tooth during that time.^{7,10-15}

Although consensus-based guidelines exist for the management of avulsed teeth, further investigations are needed to develop scientifically-based clinical guidelines, especially with respect to delayed replantation.¹⁶⁻¹⁹ Specific recommendations from the American Academy of Endodontics (AAE) guidelines¹⁶ are identified throughout this review.

This literature review concentrates on the effects of extra-alveolar duration and storage conditions on the healing of the PL of avulsed teeth following replantation. A critical assessment of the so-called "reconstitution theory" for PL cells is also presented.

Wound Healing

Dental avulsions are complex injuries that involve damage to the periodontium and pulpal neurovasculature. The terms "healing" and "repair" have been used interchangeably by many authors to describe the outcomes for replanted teeth, however, these terms are not equivalent.

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Table I

Statistics Reported For Extra-Alveolar Duration Of Replanted Teeth

Author	Size (n)	Extra-alveolar Duration (Minutes)	Follow-up Duration
Andreasen and Hjorting-Hansen ⁵	110	Mean: not reported Range: 1-1,020	Range: 2 months-13 years
Andreason et al ⁷	66	Mean: not reported Range: <20 - >120	Range: 1-20 years Mean: 5.1 years
Barrett ⁹	74	Mean: 114 Range: 1-360	Range: 1-5 years

Shows the mean and ranges of extra-alveolar durations for studies of replanted permanent teeth.

Healing occurs when a replanted tooth does not exhibit any radiographic or clinical signs of inflammatory or replacement resorption. Andreasen and Andreasen¹⁷ have speculated that healing of the PL will only occur if the innermost cell layers of the root surfaces are vital, and only under clinical conditions (i.e. after tooth avulsion) where there will be minimal damage to that layer. This cannot occur without immediate replantation.

Teeth that exhibit repair may show evidence of resorption radiographically after replantation, but can also show areas with a normal PL image. Since damage to the PL tissues is usually beyond minimal, healing with a normal PL after avulsion is rare, however, and repair is the norm.¹⁷

Andreasen and Hjorting-Hansen²⁰ were the first to describe and classify the external resorptive processes that affect replanted human teeth. Inflammatory resorption is common in replanted teeth. Radiographically, affected teeth exhibit radiolucent, bowl-shaped resorptive defects that extend to the dentin.⁵ Histologically, these areas are associated with regions of inflammation in the PL.²⁰

Clinicians are most concerned about inflammatory resorption, as it is the most rapidly progressive resorptive process, and the only one that is amenable to treatment. The usual treatment outcome with inflammatory root resorption is replacement resorption, a gradual

progressive process that resorbs the root and replaces it with bone.^{21,22} Ankylosis is diagnosed by percussion and by mobility testing. However, more than 10 per cent ankylosis must be present before it can be detected by mobility testing, and greater than 20 per cent ankylosis before detection by percussion is possible.²³

Surface resorption is a self-limiting process associated with the normal turnover of cementum. It is not observed radiographically, but is defined histologically.^{5,20,24} Surface resorption was defined by Andreasen and Hjorting-Hansen²⁰ as small superficial resorption cavities, mainly in cementum and without signs of inflammation in the PL. The pattern of PL repair is dependent on a number of uncontrollable variables, including extra-alveolar duration and storage.

Extra-Alveolar Duration

Avulsed teeth are often subjected to an extended extra-alveolar period before replantation. As shown in **Table I**, these teeth may experience extra-alveolar durations in excess of five hours before replantation.

Immediate Versus Delayed Replantation

Andreasen et al^{3,6,7} showed that immediate replantation has the greatest influence on PL healing in human teeth, and that prolonged extra-alveolar periods were associated with a decreased incidence of PL healing. Teeth replanted within five minutes exhibited a 73 per

cent PL healing rate, while teeth replanted after five minutes exhibited an 18 per cent PL healing rate. The follow-up period varied between one month and 15 years.³

As a result of these studies, the absence of cellular damage and periodontal fibre degeneration were interpreted to be the reason for the association between PL healing and immediate replantation. Andreasen et al³ speculated that if all avulsed teeth were replanted immediately, a PL healing rate of 85-97 per cent could be expected.

Andersson and Bodin² observed human permanent incisors that had been replanted within 15 minutes of avulsion for an average period of five years. In their sample (n = 21), teeth replanted immediately or within 10 minutes did not exhibit radiographic evidence of external root resorption. However, all incisors subjected to 15 minutes of extra-alveolar storage showed radiographic evidence of root resorption. The authors concluded that teeth replanted within 10 minutes of avulsion had a better prognosis for long-term retention than teeth replanted within 10 to 15 minutes. These results are consistent with those of Andreasen et al.³

A recent *in vitro* study may explain the clinical observations reported by Andreasen et al³ and Andersson and Bodin.² Lekic et al¹¹ used human teeth to study the effect of extra-alveolar duration on the clonogenic capacity of PL cells. Clonogenic capacity is the ability

Table II

Clinical outcome studies of effect of dry storage on repair

Author	Size (n)	Follow-up Duration	Assessment Method	Outcomes
Andreason et al ³	272	Mean: 5.1 years	Radiographically and clinically	Replantation <5 min.: 73% PL healing Replantation >5 min.: 18% PL healing Dry storage <5 min.: 52% PL healing Dry storage >5 min.: 24% PL healing
Andreasen and Hjørtting-Hansen ^{5,20}	110	2 months - 13 years	Radiographically	Replantation <30 minutes resulted in 90% of teeth with no resorption Replantation >90 minutes resulted in 7% of teeth with no resorption
Cvek et al ¹⁰	38	22-78 months	Radiographically and clinically	Extra-alveolar dry period >15 minutes led to ankylosis in 60% of teeth Extra-alveolar dry period <15 minutes led to ankylosis in 13% of teeth
Andersson and Bodin ²	21	Mean: 5 years	Radiographically	No resorption in teeth replanted <10 minutes All teeth replanted within 10-15 minutes exhibited resorption

Clinical studies that illustrate the relationship between dry extra-alveolar storage and resorption.

of cells to reproduce, and therefore provides an insight into the ability of PL cells to repopulate the PL after replantation.¹¹ This study found that an extra-alveolar duration of only 15 minutes caused a significant decrease in the number of PL progenitor cells, which may explain the impaired healing associated with the delayed replantation of avulsed teeth.

These studies provide strong evidence (based on clinical outcomes and cell physiology), that immediate replantation (0-10 minutes) is the decisive factor for PL healing following avulsion.

Numerous extraoral storage protocols (wet, dry, combined) and media have been investigated. However, diversity in the test parameters and the extra-alveolar durations used in these studies have yielded conflicting observations and a wide variety of interpretations. This review will describe the techniques and models used, and identify the strongest evidence-based information for clinicians.

Dry Storage

Teeth are usually subjected to desiccation in the period between their avulsion and replantation. Since both extra-alveolar duration and storage are largely uncontrollable variables, this review will categorize the major combinations of variables involved, and correlate them with the current (1994) AAE guidelines.¹⁶

Andreasen and Hjørtting-Hansen's^{5,20} two-part study, published in 1966, set the standard for the clinical management of avulsed teeth for 30 years. This study grouped teeth according to the presence or absence of replacement and/or inflammatory resorption. It found that extended extra-alveolar duration significantly increases the likelihood of resorption after replantation,^{5,20} and that dry storage adversely affects PL repair. The latter observation has since been supported by numerous other studies (Table II).

The histological results of animal studies on replantation illustrate the effects of desiccation on

the PL of avulsed teeth during extended extra-alveolar durations. Other animal studies reported that extended dry periods (30 to 120 minutes) led to an increased risk of replacement or inflammatory resorption (Table III).

Histological studies on human tissue have also demonstrated the deleterious effects of dry storage on PL healing and repair. Patil et al³³ showed that extracted teeth stored dry for 120 minutes exhibited a mean number of viable PL cells per tooth (0.29×10^5) that was significantly lower than teeth that were stored wet prior to PL cell collection (8.65×10^5). Lekic et al¹¹ similarly demonstrated that increased extra-alveolar duration of avulsed teeth combined with dry storage conditions significantly decreased the clonogenic capacity of human PL cells. Following storage at 23° C for 15 minutes, the mean clonogenic capacity of the progenitor cells found on avulsed teeth was very low (<3.0 per cent), and negligible following 30 minutes.

Table III

Effect Of Dry Storage On PL Histology After Replantation

Author	Sample (Number Of Teeth)	Experimental Duration	Observations
Loe and Waerhaug ²⁵	58 monkey and dog	8 days - 33 months	Dry storage for two hours resulted in complete necrosis of PL.
Soder et al ²⁶	Cultured human and monkey PL cells	120 minutes	Dry storage for 15 minutes resulted in 63 per cent non-viable cultured human PL cells. Dry storage for 120 minutes resulted in 100 per cent non-viable cultured monkey PL cells.
Andreasen ²⁷	160 monkey	8 weeks	Significant reduction of normal PL if extra-alveolar duration > 18 minutes (from 71 per cent at 18 minutes to 29 per cent at 30 minutes).
Andreasen and Schwartz ²⁸	160 monkey	8 weeks	Thirty minutes dry storage resulted in close to maximal damage to PL.
Andreasen and Kristerson ²⁹	20 monkey	2-8 weeks	Extended dry storage (60-120 minutes) leads to ankylosis.
Blomlof et al ³⁰	Cultured human PL cells and monkey teeth	8 weeks	After one hour of dry storage, no viable human PL cells present. After one hour of dry storage, extensive root resorption present on all surfaces of monkey teeth.
Matsson et al ³¹	36 dog	3 months	When the dry storage time exceeds 30 minutes there is a greatly increased risk of ankylosis (25 per cent at 30 minutes compared to 50 per cent at 60 minutes).
Trope and Friedman ³²	72 dog	2 months	After one hour of dry storage high incidence of replacement resorption (89 per cent).

Studies of the effect of dry storage on PL cells.

These studies showed that dry extra-alveolar storage before replantation affects both the healing and repair of the PL. It is widely agreed that dry storage for 60 minutes leads to PL cell necrosis.^{14,26,30,34} Other studies have suggested that extra-alveolar dry storage as short as 15-30 minutes in duration detrimentally affects the PL healing of replanted teeth.^{2,7,10,11,26}

In 1994, the AAE recommended immediate replantation for teeth which had undergone two hours or less of extra-alveolar dry storage.¹⁶ The evidence cited in this review indicates that immediate (0-10 minutes) replantation is associated with a higher likelihood of PL healing. Dry storage

beyond 10 minutes changes the expected outcome from PL healing to PL repair with resorption and ankylosis. Since severe detrimental effects to PL cells have been reported at and beyond 30 minutes, the two hour interval recommended in the AAE guidelines¹⁶ appears arbitrary.

Saliva Storage

Avulsed teeth often have an initial period of dry storage followed by "wet" storage in a variety of media. This paper reviews the most common media and combinations described in the AAE guidelines.¹⁶

Over 20 years ago, it was suggested that saliva should be used as an interim storage medium for avulsed teeth to prevent desicca-

tion.¹⁰ More recent studies have indicated that saliva may not be the most suitable medium for extended (greater than one hour) storage of avulsed teeth.

Blomlof et al¹³ measured the amount of ³H-uridine released from human PL cells after storage in a variety of media to identify cell membrane damage. The storage media used included pooled, whole saliva (from four donors), milk, HBSS, Triton X-100 (a non-ionic detergent) in tap water, tap water, and saline.

One hour storage in saliva resulted in approximately twice as much cell damage as HBSS, saline, or milk. However, saliva storage produced one-third less

cell damage than dry storage or storage in tap water. Blomlof et al¹³ found that HBSS was the best storage medium for extra-alveolar periods of one hour, followed by milk and saline, saliva, dry storage, tap water, and Triton X-100. They suggested that if saliva is to be used as a storage medium for avulsed teeth, the duration should be as short as possible.¹³ However, the pooled human saliva used in this study is not an appropriate model for clinical use.

Oikarinen and Seppa¹⁵ also studied the effect of storage on cultured human PL cells in saliva, milk, tap water, and Eagle's medium (control) for 60 minutes. Their experiments consisted of cell proliferation studies, collagen biosynthesis and prolyl 4-hydroxylase enzyme assays. The PL cells were obtained from a single donor. Storage of teeth in either human whole pooled saliva, milk, or culture medium for one hour did not markedly alter the proliferative capacity of PL cells. There was no statistical difference in total protein synthesis after treatment in saliva or milk, although the results for both mediums were slightly lower than the results obtained with the culture medium. Saliva and milk were equally effective in maintaining cell viability for 60 minutes, and were both superior to water.

Animal studies have demonstrated decreased PL healing of replanted avulsed teeth with increasing storage time in saliva.^{12,14,27,35} In a study conducted with monkeys, Andreasen²⁷ found that the frequency of inflammatory resorption after storage in autologous saliva for 18, 30 or 60 minutes was 17-19 per cent eight weeks after replantation. However, the percentage of inflammatory resorption in teeth stored for 90 or 120 minutes in saliva increased to 30 and 32 per cent respectively. The teeth stored in saliva exhibited no more inflammatory resorption than the teeth stored in saline or tap water, and a significantly higher per cent of normal PL was present on the teeth stored in saliva relative to those stored in tap water.

Storing avulsed teeth in saliva appears to be an acceptable op-

tion, but there are limitations to its use. A recent study by Lekic et al³⁶ investigated the clonogenic capacity of human PL cells stored for 15 minutes in autologous saliva (at 23° C), followed by storage in saliva, milk and HBSS (at 4° C) for an additional 15 and 45 minutes. The PL cells of the avulsed teeth stored in saliva for 30 minutes had a clonogenic capacity of 7.6 per cent. Storage for 60 minutes in saliva resulted in a clonogenic capacity of 1.5 per cent. A clonogenic capacity in excess of three per cent is considered a requirement for wound healing.³⁷ Lekic et al³⁶ considered saliva to be an acceptable short-term (less than 30 min.) storage medium that would prevent PL cell desiccation, and therefore maintain the viability of PL cells at a clinically significant level until the tooth could be replanted or transferred to a more suitable storage medium.

Saliva is an immediately available storage medium at all accident locations, but its use should be limited to cases where the extra-alveolar duration is less than one hour and superior storage media such as milk, saline, or HBSS are not available.

Saline Storage

Blomlof et al¹³ showed that damage to the PL cells of avulsed teeth stored in normal saline (0.9 per cent) for one hour was equal to the damage experienced following three hours of storage in milk, due to differences in osmolality.

Andreasen²⁷ used monkey incisors to study the effect of varying extra-alveolar durations and storage media on PL healing. He found that storing avulsed teeth in saline for up to 120 minutes prior to replantation resulted in 30 per cent inflammatory resorption.²⁷ Saline storage rarely led to replacement resorption, however, and a significantly higher per cent of normal PL cells were present compared to the results for tap water or dry storage. Based on these findings, Andreasen²⁷ concluded that the storage of avulsed teeth in saline offered good protection against root resorption for extra-alveolar durations of up to two hours.

The literature indicates that storing avulsed teeth in saline for short periods of time (less than one hour) is acceptable when other storage media such as milk or HBSS are not immediately available.

Milk Storage

Blomlof et al were the first to investigate the use of milk as an interim storage medium, and their work is cited most often in the literature pertaining to milk storage. Blomlof¹² and Blomlof et al^{13,35} used both human and monkey teeth in their studies, and Blomlof et al¹³ showed that cultivated human PL cells, stored in milk for 60-180 minutes, displayed approximately the same (minimal) leakage as occurred with storage in saline and HBSS. The cellular leakage observed in this study was a direct indication of PL cell damage.

Blomlof et al¹³ were the first to conclude that milk was a suitable medium for storage of up to three hours based on *in vitro* assays. Blomlof¹² measured the viability of cultured human PL cells using the trypan blue dye exclusion test. Twelve hour storage in milk maintained the viability of 50 per cent of cells.

Human PL cell viability in milk was also studied by Courts et al³⁸ using the same methodology as Blomlof.¹² Extracted teeth stored in milk maintained higher numbers of viable cells compared to teeth stored in saliva, water, or dry. After one hour, approximately 35 per cent of PL cells from the teeth stored in milk were viable. This contrasts with the 12-hour values (50 per cent) obtained by Blomlof,¹² but the discrepancy may be due to the fact that Courts et al³⁸ stored the whole tooth in milk, while Blomlof¹² used separated cells that were cultured and stored in milk. The ability to exclude dye may not be an accurate representation of a cell's viability, but instead may reflect its vitality. A cell's vitality, in turn, may not reflect its reproductive capacity. Vitality, unlike viability, does not reflect a cell's ability to properly carry out the functions it was capable of.

Blomlof et al³⁵ concluded that monkey teeth stored in milk for

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three hours displayed resorption amounts similar to those of immediately replanted teeth. However, due to the small sample size used in this study, their conclusions are not significant. Oikarinen and Seppa¹⁵ showed that after eight hours of storage in milk, there was no significant decrease in the proliferative ability of human lip fibroblasts. These findings are in agreement with Courts et al's³⁸ conclusion that milk should be recommended as the transport medium of choice for the preservation of avulsed teeth. However, given the heterogeneity of human fibroblast populations, the appropriateness of this study to the clinical management of avulsed teeth is questionable.³⁹

Trope and Friedman³² stored dog teeth in milk for up to 12 hours immediately following extraction, and then studied healing outcomes. The authors reported histologically complete healing or minimal incidence of replacement and/or inflammatory resorption eight weeks after replantation. Immediate storage in milk is unlikely at an accident scene, however.

Lekic et al³⁶ showed that PL cells stored in milk at 4° C for 15 minutes following 15 minutes storage in saliva resulted in a clonogenic capacity for PL cells of approximately 16 per cent. This was similar to the clonogenic capacity of PL cells stored in HBSS under the same conditions. PL cells stored for 45 minutes in 4° C milk following 15 minutes of saliva storage still retained a clonogenic capacity of 3.5 per cent.³⁶ Lekic et al's results demonstrated that milk was as effective as HBSS for storing avulsed teeth for up to 60 minutes, and superior to saline, saliva or water. They concluded that avulsed teeth transferred from saliva to chilled milk for up to one hour maintained sufficient numbers of viable PL cells to support replantation of the tooth and the possibility of PL healing.³⁶

These investigations support the use of milk as an interim storage medium for avulsed teeth. Milk preserves the vitality of PL cells on avulsed teeth during extended extra-alveolar periods. Most studies

agree that a majority of PL cells are still viable following up to three hours of milk storage. Compared with other media, milk has the added advantage of being widely available in a chilled state at or near most accident sites where a dental injury has occurred.

Tap Water

Tap water has been shown to be an unacceptable storage medium for avulsed teeth. Blomlof et al¹³ found that storing cultured human PL cells in tap water for one hour caused more PL cell damage than the 10 physiologic and non-physiologic storage media they tested. In fact, storage in tap water for one hour was shown to cause more cell damage than dry storage for the same amount of time, and five times more cell damage than milk storage.¹³

Blomlof et al¹³ attributed the increased cell damage to the cell lysis caused by the very low osmolality of tap water. Oikarinen and Seppa¹⁵ also found that tap water storage for one hour led to a greater decrease in total protein and collagen synthesis, and a lower rate of cell proliferation, in a human PL cell culture preparation than storage in milk or saliva.

Andreasen²⁷ studied the effect of storing monkey teeth in tap water for two hours, and found that this medium produced significantly higher rates of replacement resorption than the other media tested. Tap water storage also resulted in a significantly lower percentage of normal PL cells than saline or saliva storage.

The original results of *in vitro* and *in vivo* studies have consistently shown that tap water is not a suitable interim storage medium for retaining the viability of PL cells on the root surface of avulsed teeth.

Hank's Balanced Salt Solution (HBSS)

HBSS is a sterile, physiologically-balanced isotonic salt solution that is most commonly used for the irrigation of wounds. It is not a cell culture medium, but is currently thought to be a desirable interim storage medium for avulsed teeth. HBSS has been used as a reference medium in several studies that ex-

amined the value of storage media for avulsed teeth.^{13,16,36,38,40-43}

Blomlof¹² found that HBSS was slightly better at preserving the cell vitality of cultured human PL cells than milk, saliva, or saline storage for one, two, or three hours. Matsson et al³¹ stored extracted dog incisors in HBSS for 30 or 60 minutes prior to replantation, then analysed the teeth histologically three months after replantation. Approximately 20 sections of each tooth, and four areas on each section of tooth (sites), were analysed for signs of resorption.⁴⁴ The dog incisors stored in HBSS for either 30 or 60 minutes showed negligible areas of ankylosis (0.3 per cent of sites), but 17 per cent of sites showed signs of resorption. Presumably these sites exhibited inflammatory resorption, but the author does not clarify this point.

The percentage of sites without resorption was similar following 15 minutes of dry storage and 15 minutes of dry storage followed by 30 minutes of HBSS storage (85 and 86 per cent respectively). However, it should be noted that the authors used a p-value of 0.1 instead of the usual p-value of 0.05.

Other studies have dealt with the effect of HBSS storage on PL cells. Courts et al³⁸ concluded that HBSS was more effective at preserving PL fibroblast vitality and proliferative ability than milk, saline, dry storage, and water storage. Hiltz and Trope⁴⁵ showed that 27 per cent of cultured human lip fibroblasts cells remained viable and maintained normal cell morphology up to 72 hours after being placed on plates containing HBSS. This experiment was done *in vitro*, however, under aseptic conditions that would not be encountered clinically.

Trope and Friedman³² reported that eight weeks after replantation, HBSS and ViaSpan storage were superior to milk storage in reducing both replacement frequency and inflammatory resorption after storage for up to 96 hours before replantation.

Huang et al⁴³ cultured PL cells from extracted human teeth, and then measured cell viability after storage in different media for one to 96 hours by the number of cells



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attached to the culture dishes. Following storage in HBSS for three hours, 90 per cent of cells remained attached. Similarly, after storage in HBSS for 72 hours, 47 per cent of cells still remained attached.

In this study, the test for cell viability was dependent on the morphological appearance of the cells, and may not necessarily be a good indicator of the ability of these cells to promote healing.

A recent study by Lekic et al³⁶ found that teeth stored in chilled HBSS (4° C) for 45 minutes following 15 minutes of saliva storage maintained a comparable number of viable PL progenitor cells compared with teeth stored in milk under the same conditions.

The literature indicates that HBSS is a desirable storage medium for avulsed teeth, even when the extra-alveolar period is extensive. HBSS appears to be superior to many other storage media in its ability to preserve cell vitality and viability. Unfortunately, HBSS is rarely available at an accident scene. Many hospital emergency departments use a generic balanced salt solution for irrigation purposes. In addition, a tooth preserving system containing HBSS is being manufactured, but is not widely available.

ViaSpan

ViaSpan is a transplant organ storage medium that has been suggested for the storage of avulsed teeth.⁴⁴ Hiltz and Trope⁴⁵ concluded that ViaSpan is an effective long-term storage media, based on a model that used human lip fibroblasts. After 168 hours of ViaSpan storage, 38 per cent of the initial fibroblasts retained their vitality.

An outcome study by Trope and Friedman³² used replanted dog incisors that were stored in ViaSpan for six to 96 hours. Teeth that were replanted after storage for up to 12 hours in ViaSpan showed no signs of replacement or inflammatory resorption. The practicality of using ViaSpan as a storage media must be considered, however, since this product is presumably even less available than HBSS.

Dry and Saline

Cvek et al¹⁰ suggested that when avulsed teeth are stored for up to 40 minutes in dry storage, followed by a wet (saline or saliva) storage interval of 25-60 minutes, the occurrence of ankylosis is much lower than for teeth stored in dry conditions for up to 40 minutes (20 per cent compared to 60 per cent) prior to replantation. Based on this finding, Cvek et al¹⁰ concluded that if avulsed teeth have been kept dry for more than 15 minutes, they should be stored in an isotonic saline solution for about 30 minutes before replantation. Presumably this conclusion is based on the concept that PL cells might be reconstituted or "re-conditioned," a term used by Cvek,¹⁰ in some manner that might decrease the incidence of resorption and ankylosis. The nature of this theory is unknown, and inference about healing and repair in humans was made on the basis of clinical examination and dental radiographs only.

Patil et al³³ assessed the viability of human PL cells after storage in saline for 120 minutes following dry storage for 10 minutes. There was no significant difference in viability between the PL cells recovered from 120 minute saline storage group and the cells recovered immediately after extraction. It cannot be concluded from these results that dry storage followed by saline storage had a positive effect on viability, since the cells recovered following 10 minutes of dry storage alone were not assayed. However, the results suggest that saline storage for 120 minutes following a 10 minute dry storage does not have a detrimental effect on the viability of PL cells. The saline used in this study was a commercial contact lens solution (containing sterile saline, borate buffer, sorbic acid, and edetate disodium) that may itself have affected PL cells.⁴³

An investigation conducted by Andreasen and Schwartz²⁸ on monkeys failed to demonstrate a beneficial effect of saline storage following 30 minutes dry storage.

This study challenged the "reconstitution" theory of Cvek et al.¹⁰

Andreasen et al^{3,6-8} did not demonstrate a significant difference in PL cell healing following dry storage for 10-40 minutes and dry storage for 10-40 minutes followed by saline storage. However, saline storage significantly decreased PL healing in teeth stored dry for nine minutes or less.³ The effects of additional extra-alveolar storage time in saline was not reported.

These investigations support the concept that early desiccation is the decisive factor in periodontal healing. If the extra-alveolar duration exceeds five to 10 minutes, and the tooth is stored dry, the chances of healing are considerably decreased. The Cvek et al¹⁰ study may be the origin of the concept that "treatment" of the dry tooth is preferred to replantation at the earliest possible time.

Temperature and Media

Blomlof and Otteskog⁴⁶ used cultured human PL cells to study the effect of storage in milk at various temperatures. Although no statistical test for significance was performed, storage in milk at 4° C resulted in slightly better cell viability than storage at 20° C for all extra-alveolar durations. The number of viable PL cells present at 4° C was almost as high after 180 minutes as the number of cells present following storage at 20° C for 60 minutes.

Blomlof¹² confirmed the findings of Blomlof and Otteskog.⁴⁶ Storing cultivated human PL cells in milk from one to three hours did not significantly reduce the number of viable cells, and storing them in milk at lower temperatures (4° C and 20° C, rather than 37° C) preserved a higher number of viable cells. Storage at 4° C produced the best results.¹²

Huang et al's⁴³ results are in conflict with those of Blomlof.¹² Cultured human PL cells were stored in various media at 4° C or 20° C, from one to 96 hours. Although no hypothesis testing was done, there was a slight increase (less than two per cent) in the number of viable PL cells available after

Table IV

Development Of the Reconstitution Theory

Author	Conclusions
Cvek et al ¹⁰	To increase PL healing, teeth stored in dry conditions for > 15 minutes should be stored for 30 minutes in isotonic medium prior to replantation.
Matsson et al ³¹	Teeth with an extra-alveolar duration > 15 minutes should be stored in an isotonic solution for 30 minutes prior to replantation to minimize ankylosis.
Krasner ⁴⁷	HBSS in the Emergency Tooth Preserving System (ETPS) "preserves and rejuvenates the tooth" for up to 12 hours.
Krasner et al ⁴⁸	ETPS extends the critical time for replantation (from 30 minutes to four hours or more).
Krasner and Person ⁴⁰	HBSS in ETPS "preserves and reconstitutes PDL cells of avulsed teeth for many hours, if not days."
Krasner and Rankow ⁴¹	Cite work of Cvek et al ¹⁰ and Matsson et al ³¹ as support for treatment of avulsed teeth with HBSS prior to replantation.

Publications that have discussed the concept of reconstitution of PL cells.

storage in milk at 4° C compared to the number available after storage at 20° C. At one hour, however, the cells stored in milk at 20° C contained a much greater proportion of viable cells (78 per cent) than those stored at 4° C (38 per cent). These results disagree with all other *in vitro* studies, and could be due to differences in culturing and evaluation methods.^{11,12,46}

Lekic et al¹¹ studied the effects on cell viability, attachment, and clonogenic capacity of storing human PL cells at 4° C and 23° C. The results from all assays showed that the temperature of the storage medium affected the viability of PL cells. Without exception, the highest percentages of viable cells and cells with clonogenic capacity were found on teeth stored in milk at 4° C.

There is strong evidence that the extra-alveolar storage of avulsed teeth is improved by using chilled storage media. Storage in liquid media that is packed in ice is the standard procedure for organ transport.

Reconstitution Of Cells

The theory of "reconstituting" PL cells was first suggested by Cvek et al¹⁰ and later mentioned

in Matsson et al,³¹ Krasner,⁴⁷ and Krasner et al.⁴⁸ Krasner et al⁴⁸ suggested that HBSS may "rejuvenate" degenerating cells within the first hour of an extra-alveolar period. Krasner et al⁴⁸ cite the work of Cvek et al¹⁰ and Matsson et al³¹ as evidence that storage in HBSS may "reconstitute" PL cells. **Table IV** lists the studies and some of the typical publications that have been associated with the concept of reconstitution of cells.

Cvek et al¹⁰ assumed that storing avulsed teeth in isotonic medium prior to their replantation washed off the breakdown products of autolysed cells, which could not be used by viable cells, and would act both as a substrate for bacteria and as a chemotactic agent for inflammatory cells if they were present on the teeth at replantation.

The clinical outcome study by Andreassen et al³ found that a combination of wet and dry storage resulted in a significantly lower healing rate in teeth stored for more than 20 minutes, and that saline storage significantly decreased PL healing in teeth that were stored dry for up to nine minutes prior to being placed in saline. In teeth that were stored dry for longer durations, no significant difference

could be found in PL healing rates between dry storage and dry storage followed by saline storage.

Matsson et al³¹ replanted dog incisors that had been stored either dry, dry followed by storage in HBSS, or in HBSS alone. Even though ankylosis was significantly reduced in the teeth stored in HBSS, the percentage of root sites with external resorption was approximately the same for teeth stored dry (16 per cent) and teeth stored dry followed by wet storage in HBSS (14 per cent). Therefore, it cannot be concluded that HBSS rejuvenates degenerating PL cells based on the results of the Matsson et al³¹ study alone. Whether "reconstituted" cells are phenotypically/physiologically normal is also unknown, as no studies have been conducted to determine the properties of "reconstituted" cells.

Krasner and Person⁴⁰ investigated the success rate of replanted teeth that had been stored in HBSS. Teeth that were subjected to an extra-alveolar period of 15-120 minutes and subsequently stored in HBSS showed a "success rate" of 91 per cent, including teeth that showed some radiographic signs of root resorption. There were problems with this

Table V

Evidence-based Principles For the Management Of Avulsed Permanent Incisors

1. The most important factor for healing of the periodontal ligament is immediate (less than five minutes) replacement of the tooth back into its socket.
2. Replantation of a tooth is always superior to maintaining a tooth in any storage medium.
3. There is no evidence from cell biology investigations that intentionally prolonging the storage of avulsed teeth in any media will reconstitute root surface cells.
4. Desiccation of cells on the root surface immediately following the avulsion injury has been shown to drastically reduce their ability to reproduce.
5. Immediate storage in the patient's own saliva followed by transfer to cold milk has been shown to maintain the reproductive potential of root surface cells for up to one hour.
6. Milk that is kept cool by packing it in ice has been shown to be a superior storage medium than milk that is allowed to warm to room temperature.
7. Water is an unsuitable storage medium that causes rapid cell death. It is used for a rinse prior to replantation only if no other irrigating solution is available.

survey, however, in both the methodology and interpretation of data, and there was no indication that a standardized protocol for the treatment of the avulsed teeth, such as the AAE recommended guidelines,¹⁶ was followed. Inter-examiner variability was not evaluated statistically for the radiographic interpretation of ratings, and the data did not include the initial storage conditions and extra-alveolar duration before placement in HBSS. Therefore, it cannot be concluded that "success" at the 30-month interval was related more to the storage medium than to the extra-alveolar duration before replantation, or both.

Due to the many variables in this study, Krasner and Person's⁴⁰ conclusion that HBSS reconstitutes PL cells cannot be substantiated. As indicated in this review, we are unaware of any study that has produced conclusive evidence that HBSS storage following dry storage "reconstitutes" PL cells.

Summary

It is widely accepted that avulsed teeth should be replanted immediately whenever possible. However, given that most individuals present at an accident scene are unwilling to replant an avulsed tooth, and the confusion that often exists in the immediate aftermath of an accident, immediate replan-

tation seldom occurs. Desiccation of the root surface PL tissue prior to the replantation of avulsed teeth is therefore common. Storage in the patient's own saliva, which is readily available at the accident site, provides immediate protection from desiccation. There is no evidence to support purposely extending the extra-alveolar duration to condition an avulsed tooth prior to its replantation.

Acceptable storage media for avulsed teeth include Eagle's Medium, ViaSpan, HBSS, milk, saline, and saliva. Tap water is an inappropriate storage media due to its hypotonicity. Chilling enhances the preservation effects of all acceptable storage media. Chilled cell culture media (i.e. Eagle's Medium, ViaSpan) are the preferred storage media, but are rarely available at the accident site. Osmotically-balanced solutions such as milk (food product) and HBSS or saline (irrigating solutions) are all acceptable storage media. However, only milk is commonly available and found in the chilled state. Packing the tooth and milk in ice will maintain the desired low temperature without diluting the milk and decreasing its osmolality.

The current literature indicates that PL cell healing is severely compromised when an extra-alveolar period extends beyond 10

minutes, regardless of storage method. This reduces the previous benchmark, which suggested that PL healing could be expected following extra-alveolar storage periods of up to 30 minutes. Dentists can advise parents and patients that the survival of replanted avulsed teeth will be enhanced if the avulsed tooth is stored in some media prior to replantation. However, the expected outcomes are always root resorption and ankylosis, which often lead to extraction. ■

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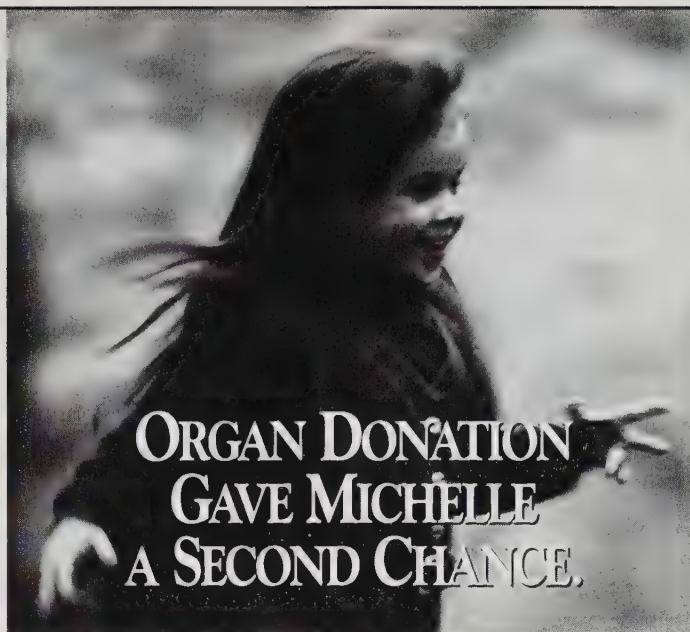
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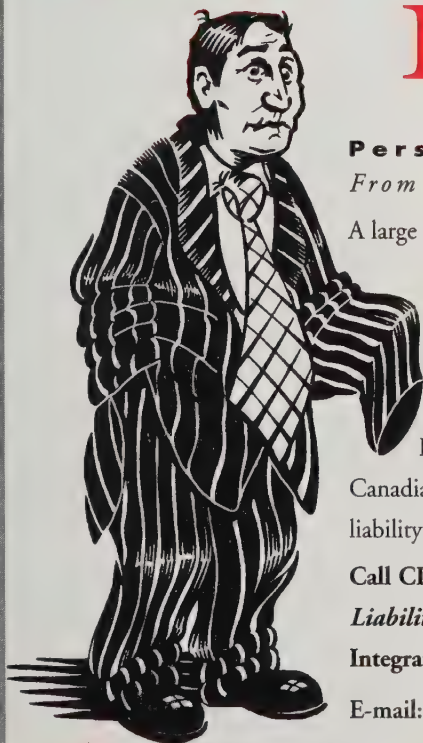


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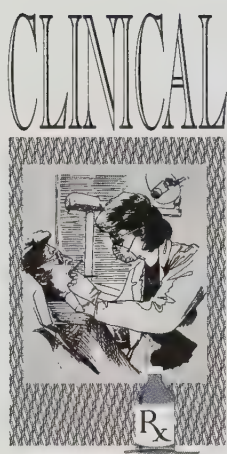
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Endopore : Une nouvelle génération d'implants

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ABSTRACT

The Endopore implant system has gained popularity since it was first commercialised. Developed at the University of Toronto, its unique design is characterized by a partial porous coating and a tapered, truncated-cone, endosseous root-form. These features allow for ease of placement, a faster healing period, the use of shorter implants, and greater resistance to torque (due to bone ingrowth in the porous coat). This article discusses the design and fabrication of the Endopore implant. The surgical procedure as well as the main advantages of this new type of implant are also considered.

Key words: implant, endosseous implant, Endopore

Introduction

Depuis leur entrée sur le marché, les implants dentaires offrent une alternative de traitement intéressante pour de nombreux individus qui présentent des édentations partielles ou complètes. Il ne faut pas s'étonner que les recherches se multiplient pour trouver un système implantaire qui permettra d'optimiser les résultats même lorsque les conditions cliniques ne sont pas idéales. Il y a presque 20 ans, on effectuait déjà des recherches sur des implants à

revêtement poreux pour des prothèses orthopédiques¹ à l'Université de Toronto. Compte tenu du niveau élevé de succès obtenu, on a développé un nouvel implant dentaire : l'Endopore. Avec sa surface poreuse et sa forme conique, il se distingue tant sur le plan microscopique que macroscopique². On peut même parler d'une nouvelle génération d'implant.

Caractéristiques de l'implant

L'implant Endopore est de forme conique, tronçonnée, plus étroit à l'apex. Sa surface est poreuse et composée de trois couches de microsphères de titane appliquées selon un procédé de frittage³. La surface irrégulière est en contact avec l'os alors que la surface lisse du col est en contact avec les tissus mous⁴. L'implant standard a un diamètre de 4,1 mm au niveau de la couronne et peut avoir trois longueurs soient : 7,0; 9,0 ou 12,0 mm. La portion coronaire de l'implant est formée d'un col usiné, lisse et poli de 1,0 ou 2,0 mm de hauteur. Les trois derniers formats ont un col usiné de 1,0 mm. Il y a la version étroite de 3,5 mm de diamètre et de 9,0 mm de longueur ainsi que l'implant de 5,0 mm de diamètre et de 7,0 ou 12,0 mm de longueur. De plus, l'implant Endopore est disponible avec une tête hexagonale universelle et les com-

posantes des restaurations compatibles^{4,5}. (Fig. 1)

Mode de fabrication

Le revêtement poreux de l'implant est fabriqué par frittage, un procédé utilisé dans la métallurgie des poudres pour réaliser une agglomération des produits traités. Plus particulièrement, ce sont des microsphères composées d'un alliage de titane, d'aluminium et de vanadium (poudre de Ti₆Al₄V) qui sont fusionnées sous vide à haute température (1250°C) sur le squelette de l'implant composé du même alliage. Il en résulte une surface poreuse (de 300µ d'épaisseur) formée de deux ou trois couches de particules interreliées et fixées au squelette. Le diamètre des pores de cette surface varie de 50 à 200µ⁷. Il a été démontré que ce diamètre favorise la croissance d'os plutôt que de tissu conjonctif fibreux^{4,6}.

Les implants filetés et cylindriques

Les implants dentaires qui ont le plus de succès clinique sont de type filetés et cylindriques⁸. Bien que leur fiabilité ne soit pas mise en doute, ces implants présentent toutefois certains désavantages :

- i) une technique chirurgicale qui nécessite une formation et un appareillage élaborés^{4,6};
- ii) un temps initial de guérison de 4 à 6 mois⁶;

- iii) la nécessité d'une longueur d'implant maximale afin d'optimiser la surface de contact entre l'os et l'implant. Cette surface favorise une meilleure distribution de la charge occlusale et limite la possibilité d'une perte de l'os cortical au sommet de la crête^{4,6};
- iv) une distribution inégale des forces occlusales vu leur forme parallèle. Ce phénomène a été décrit par Kitoh qui indiquait que la distribution des stress de la portion coronaire à la portion apicale de l'implant est évaluée dans une proportion de 29 à 1. Selon l'étude de Kitoh, pour réduire le stress au niveau de la crête, il faut soit augmenter le diamètre de l'implant, soit réduire sa surface au niveau de l'apex²;
- v) des coûts relativement élevés pour les patients⁴.

Aussi, ce système a démontré une résorption de la crête osseuse jusqu'à 1,0 mm après la première année, et environ 0,1 mm par an les années subséquentes⁹. On peut présumer qu'une certaine résorption osseuse peut être prévue avec les autres systèmes d'implants sur le marché. Les facteurs qui influent sur cette perte osseuse n'ont pas encore été élucidés mais pourraient inclure :

- i) Une migration des bactéries de la cavité buccale le long de l'interface tissu-implant^{7,9}. Ces bactéries pourraient provenir de la plaque au pourtour de l'implant et pourraient provoquer une inflammation des tissus gingivaux, d'où l'importance pour le patient de maintenir une hygiène buccale adéquate.
- ii) La qualité de l'os de la crête alvéolaire. Une étude avait comme objectif d'examiner l'influence de la qualité de l'os sur la transmission des forces occlusales sur l'implant. On a conclu que le placement d'implants dans un os ayant une couche corticale épaisse et d'une densité élevée diminue la concentration des stress à



Fig. 1: Implant standard Endopore avec une tête hexagonale universelle.

l'interface os-implant. L'implant est alors plus stable et, conséquemment, favorise l'intégration tissulaire¹⁰.

- iii) Une chirurgie traumatique, c.à.d. une surchauffe du site chirurgical lors du forage ou une contamination de la surface implantaire lors des manipulations chirurgicales⁷.
- iv) Une surcharge fonctionnelle de l'implant. Cette surcharge, surtout si elle est prématurée, pourrait occasionner des micromouvements implantaires ce qui initierait possiblement une pseudo-intégration de tissus fibreux à l'implant menant à un échec implantaire¹¹.

Le système Endopore

Le principal désavantage des systèmes d'implants à revêtement entièrement poreux est que dans le cas d'une éventuelle migration apicale de la crête osseuse, les pores, une fois exposés aux fluides buccaux, pourraient agir comme des foyers de colonisation bactérienne. Ces bactéries seraient une cause potentielle d'inflammation des tissus gingivaux au pourtour de l'implant, et à long terme, d'un échec implantaire. Afin de pallier ce problème, un col usiné de 1,0 ou 2,0 mm de hauteur est placé à la partie coronaire de la surface radiculaire de l'implant. Ainsi, la résorption osseuse initiale peut se

faire sans risquer l'exposition de la couche poreuse⁷. Mais certains essais cliniques ont démontré que l'implant Endopore pouvait être placé là où il manquait de l'os et là où la surface poreuse n'était pas entièrement submergée. En fait, on a noté radiographiquement une production osseuse aux endroits où la couche poreuse avait été exposée auparavant⁴.

Une étude comparative effectuée sur des chiens Beagle avait pour but d'évaluer le remaniement osseux au pourtour des implants de type Brånemark (fileté et cylindrique) et de type Endopore (poreux et conique)⁹. Les implants de type Endopore étaient divisés en deux catégories, soient 1) ceux à revêtement poreux sur toute la surface (FPC) et 2) à revêtement poreux sur les deux tiers apicaux, le tiers coronaire étant lisse (PPC). Huit chiens ont reçu 32 implants de type FPC parmi lesquels 22 ont été rejetés suite à l'infection. Les 10 implants résiduels ont démontré radiographiquement une production osseuse après 32 semaines de mise en fonction.

Six autres chiens ont reçu chacun quatre implants, soient deux filetés d'un côté et deux PPC de l'autre côté. Pour les implants filetés, la perte osseuse maximale s'effectuait au cours des premières 20 semaines. Pour la majorité des implants PPC, la région adjacente au col lisse était recouverte de tissu fibreux. Si on compare le remaniement osseux observé avec les implants PPC et les FPC (les 10 ayant réussi) ce sont les PPC qui démontrent la plus grande perte osseuse après 54 semaines. Ceci s'explique par un manque d'intégration de la portion coronaire lisse de l'implant et de l'os environnant. Ainsi, la croissance osseuse observée au pourtour des implants FPC semble favoriser leur usage par rapport aux implants filetés. Cependant, le taux d'échec élevé dû à l'infection associée à ce type d'implant (22 sur 32) fait d'eux une alternative de traitement inacceptable sur le plan clinique.

Une autre étude effectuée chez le chien avait comme objectif d'évaluer la corrélation existant entre la longueur du col usiné sur

un implant à revêtement partiellement poreux et la migration apicale de l'os de la crête⁷. L'hypothèse était que la variation de cette hauteur affecterait les forces exercées sur l'os lorsque l'implant est en fonction. Dans l'étude, deux types d'implants variant seulement par l'étendue des surfaces recouvertes par l'alliage poreux ont été comparés. Le premier implant (A) avait un col usiné de 1,8 mm tandis que le second type (B) avait un col de 0,75 mm. Le niveau osseux au pourtour des implants fut évalué visuellement et radiographiquement sur une base régulière pendant 12 semaines.

Une perte osseuse significative plus importante fut notée avec les implants de type A; cette différence était détectable dès le premier mois de mise en fonction. Du côté des implants de type B, l'os s'était remodelé jusqu'à la jonction surface usinée-poreuse. Il a fallu plus de temps aux implants de type A pour se rendre à cette même jonction. On retient que l'os semble migrer jusqu'à la jonction lisse-poreuse peu importe la hauteur du col usiné^{4,7}, cette dernière ne faisant que varier le temps nécessaire pour se rendre à ce point.

Malheureusement, il existe peu d'études longitudinales chez l'humain. À Toronto, en 1989, un essai clinique fut effectué sur 52 adultes âgés de 34 à 69 ans¹². Tous les sujets reçurent trois implants Endopore au maxillaire inférieur antérieur et une prothèse hybride. Après six ans, parmi les 48 patients faisant toujours partie de l'étude, 22 comptaient cinq ans d'usage et 26 comptaient six ans d'usage. Le taux de succès global de l'essai clinique est de 93,4 pour cent¹³.

Technique chirurgicale

On dit que l'utilisation de l'implant Endopore convient aux installations d'un cabinet dentaire, le rendant accessible au praticien-généraliste⁴. La technique d'insertion peut se diviser en deux sous-classes selon le mode d'ostéotomie, soient avec l'usage de forets ou d'ostéotomes. Cependant, avant de procéder à la chirurgie,

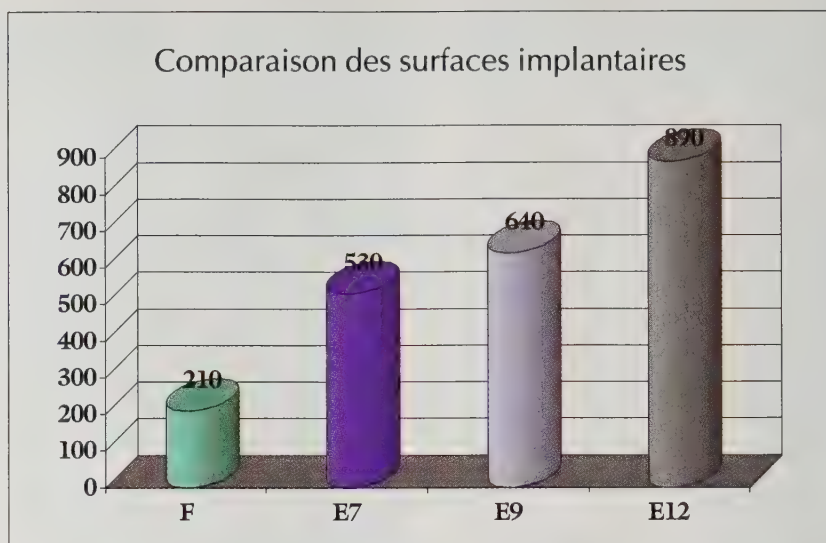


Fig. 2: Un implant fileté (F) de 10 mm de long et de 4,5 mm de diamètre a une surface de 210 mm². L'implant standard Endopore a une surface de 530 mm² pour l'implant de 7 mm de long (E7), 640 mm² pour l'implant de 9 mm de long (E9) et 890 mm² pour l'implant de 12 mm de long (E12).

l'instrumentation appropriée doit être sélectionnée. Les radiographies sont essentielles pour évaluer la proximité des structures anatomiques. Afin de mieux guider notre choix d'implant, des gabarits radiographiques sont disponibles.

Forets

Le premier stade chirurgical (phase I) pour le système Endopore se résume en quatre étapes : i) le foret guide, ii) la fraise, iii) la jauge d'essai, et iv) la mise en place de l'implant.

i) Le foret guide

L'os est exposé via une approche par lambeau conventionnelle. Le site de forage est marqué à l'aide d'une fraise boule n° 6. Le foret initial à irrigation interne est utilisé à 1000 tours par minute jusqu'à la profondeur correspondant à la longueur de l'implant choisi. L'irrigation est nécessaire pour enlever tous les débris osseux et pour éviter une surchauffe du site chirurgical.

ii) La fraise

L'ostéotomie est poursuivie avec une fraise de la même forme que l'implant à 700 tours par minute. Cette dernière est enfoncée jusqu'à la longueur de l'implant choisi.

iii) La jauge d'essai

Le site implantaire est bien irrigué pour évacuer tous les débris osseux. Une jauge d'essai, qui est également de la même forme que l'implant, est insérée dans le site. Tous les aspects de la jauge sont inspectés pour assurer que son épaulement est au niveau, ou en dessous, de la surface osseuse. Si le bord de l'épaulement est visible, la fraise est introduite doucement en vue d'élargir le site implantaire.

iv) La mise en place

L'implant est transféré au site puis l'outil servant à le placer est désengagé par un léger mouvement de bascule. L'extrémité de plastique de l'impacteur sert à protéger la tête de l'implant des coups de maillet. L'impacteur est positionné sur l'implant et plusieurs frappements secs de maillet sont nécessaires afin d'insérer fermement l'implant dans le site. Les boutons de guérison sont mis en place et la gencive est refermée avec des sutures.

Lors de la phase II (l'exposition), les boutons de guérison sont enlevés chirurgicalement pour être remplacés par des piliers de guérison. Ces derniers resteront en place au moins deux semaines afin de permettre la guérison des tissus mous. Par la suite, des piliers sont vissés aux implants et s'adapteront aux prothèses⁴.

Ostéotomes

La forme conique de l'implant se prête bien à cette technique chirurgicale. Il existe différentes formes d'extrémités d'ostéotomes qu'on insère avec un maillet afin de préparer le site pour l'implant. La trousse d'ostéotomes Endopore comprend un embout pointu « de départ » tandis que les autres embouts sont contondants et de forme analogue à l'apex de l'implant. Les ostéotomes sont utilisés de façon séquentielle afin d'écarter l'os et d'y insérer l'implant⁵.

Les principaux avantages

- i) Une instrumentation spécialisée minime^{2,4,6,14}.
- ii) Une approche chirurgicale de plus courte durée que pour un implant fileté conventionnel¹².
- iii) Un temps initial de guérison réduit, c'est-à-dire 10 semaines au maxillaire inférieur, antérieur et 16 semaines pour les maxillaires supérieur et inférieur postérieurs^{4,6}.
- iv) Une surface d'implant correspondant de trois à cinq fois la surface d'un implant fileté par unité de longueur^{3,9,12}. (**Fig. 2**) Un implant plus court peut être utilisé dans des régions qui, traditionnellement, n'auraient pas permis l'insertion d'implants^{4,6}. Cela représente aussi une moindre nécessité de recourir aux élévations de sinus ou aux greffes osseuses.
- v) L'os qui entoure l'implant s'imbrique dans les microsphères¹⁵ fournissant une meilleure résistance aux forces de torsion^{4,6}.
- vi) Sa forme reflétant celle d'une racine naturelle¹², il est probable que l'implant puisse être mis en place à un angle optimal de zéro degré. Sur le plan esthétique, cet angle permet un profil d'émergence idéal de la restauration définitive.
- vii) Un coût moins élevé que pour les implants conventionnels, donc plus rentable pour le praticien et plus économique pour le patient¹².

Conclusion

Le système d'implant Endopore offre des possibilités de restaura-

tions intéressantes tant pour le dentiste que pour les patients. Les succès rapportés par les chercheurs de l'Université de Toronto sont sans équivoque. Il n'en demeure pas moins que des études longitudinales effectuées dans plusieurs autres centres de recherche seraient nécessaires pour s'assurer de sa fiabilité à long terme. Il semble toutefois que des essais sont présentement en cours aux États-Unis et au Japon.

La surface de l'implant Endopore est unique et semble faciliter l'ostéointégration. De plus, à l'heure actuelle, les recherches se multiplient pour tenter d'améliorer cette surface par divers moyens tels que le mordantage, le traitement thermique et le revêtement d'hydroxyapatite vaporisé de plasma. Ces études contribueront sûrement à augmenter le nombre de succès cliniques. ■

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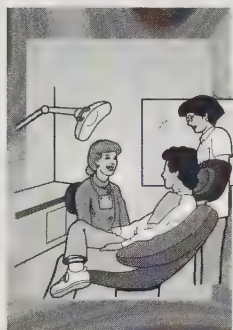
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DENTAL EDUCATION



The Part-Time Clinical Instructor In the Undergraduate Dental Clinic

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Adam Chapnick

ABSTRACT

Currently, part-time dental instructors do not receive formal training in education. According to the recent literature, some instructors may not be aware of all the options available to them in the clinic. It has been observed, for example, that instructors have demonstrated the greatest effectiveness while acting as facilitators rather than as educators. These instructors are able to incorporate their position as role models into their teaching. Dental departments must understand that the tone established in the clinic has a significant impact on the quality of their students' learning experience. This tone arises out of open dialogue between instructors and their students. The complexities of successful teaching can only be conquered when more information is provided to part-time staff.

Over 20 years ago, Laswell and Hill wrote: "The development of pedagogical skills by the part-time faculty is of primary importance. Dental education is no longer in an era where knowledge of subject matter alone can be considered sufficient qualification for the teacher."¹

Today, few dental schools provide instructors with the formal education they need to acquire the

skills of an effective undergraduate clinical teacher.² Consequently, many part-time clinical instructors have yet to develop their own individual philosophy of teaching.

In discussing Carl Rogers' book, *Freedom to Learn*, Lutz suggests that "faculty members may not actually teach anyone anything."³ Lutz argues that since all learning is the result of experience, teachers must instead strive to simply shape the direction of the learner's experience through good counsel and positive behavior reinforcement.

The question is: Are part-time clinical instructors (or any dental instructors) teachers or facilitators of learning? How individual instructors answer this question will determine their teaching style, and the type of teacher they become.

Goode wrote: "The professor who prides himself on his standards, and believes he shows high standards when a goodly number of students fail, does not realize that the real failure is his own — they failed because he taught poorly, constructed poor tests, or both."⁴

Graduates of undergraduate dental school recall fondly the part-time instructors who were considered exceptional. Those instructors were able to communicate clearly, to demonstrate techniques effectively, and to be tactful.⁵ They used their skills to set an

emotional tone for the clinical session, and they acted as role models for their students.

McKenzie wrote: "A negative attitude sets a negative emotional tone. Students avoid the instructor, won't ask questions and will comply with the instructor's example only when the instructor is present, but probably not in practice."⁶

Not every excellent clinician should be an undergraduate clinical instructor. If instructors do not feel respect for their students, if they do not believe that dental students want to be the "best that they can be," that attitude will be reflected in their teaching.

Dental departments must also make a contribution to the learning process. They must have well defined, clear goals that are understood by both instructors and students. If the instructors do not agree with the goals, they will undermine the department and confuse the students. If the students cannot see the purpose of a particular procedure or understand what is expected of them, they will adopt a negative attitude toward their instructors' discipline before they even enter the clinic.

Instructors must prove the relevance of each clinical session to their students. This may seem obvious, but reminding fourth-year students that they will be practising independently in less than one

year — without an instructor looking over their shoulders — is one way of indicating both the limited amount of time that students have left in school, and the importance students should place on their continued development as clinicians.

In setting the tone for each session, instructors must motivate their students. They must, wrote Trott, "guide, urge, and encourage students to formulate answers of their own, rather than relying on the 'dispenser of all knowledge and skill' — if done properly, this can build confidence in students as they are forced to take responsibility. Every contact between student and instructor must challenge the mind."⁷

Some authors have suggested that expertise is characterized not by the possession of any superior general strategies (e.g. problem solving skills), but rather by the availability of an extensive organized body of specialized knowledge.⁸ In large part, the process leading to correct diagnosis results from a comparison of the current situation to the previous situations lodged in one's memory.

In the clinical setting, students may not be able to benefit from their previously acquired knowledge, because they have yet to organize what they have learned effectively. It is generally maintained that the necessary restructuring of a person's knowledge base only takes place in response to the demands of the tasks that are posed to that individual.⁹

The students' ability to activate and use the knowledge stored in their long-term memory may depend on certain contextual cues. For whatever reason, the knowledge gained from a lecture setting may not transfer to the clinical setting. Instructors must help students integrate and correlate this knowledge, and show them how to apply it to the present situation. Essentially, instructors must somehow discover the key to unlocking each individual student's knowledge.

To set a positive emotional tone for a clinical session, instructors must act as role models. They must actively demonstrate the knowledge, skills, attitudes, and ethical

behaviors that students should acquire.¹⁰ Students need opportunities to observe role models in action, and to study their behaviors.

Instructors must verbalize their thinking processes and defend their recommendations. They must also show a willingness to admit their own shortcomings. These actions demonstrate that the instructors are self-assured and flexible. They encourage students to voice the rational opposition and critical dissent that are necessary components of their learning process. Students should not be fearful of defending ideas or attitudes that are incompatible with those of their instructors. Similarly, instructors must be sufficiently confident in their own abilities to guide students in the right direction, but flexible enough to admit that they do not always have the right answers. A student's comfort with an instructor's presence is a reflection of the emotional tone that has been set in the clinical environment.

As role models, instructors must recognize that there are individual differences in how students learn, and that students must be taught in "layers not in lumps." They must organize information in connected structures, with easy access to similarities, differences, and characteristics that link together the knowledge that students already possess. Oral examples may not suffice for some students. Models or other more innovative techniques may be required at chairside for those who learn by other methods (e.g. visually).

Evans and Massler suggest that instructors must have a consistent presence in the clinic, and must make themselves available to their students. They argue that instructor visibility and accessibility enhance the learning process significantly.¹¹ As role models, when instructors have to leave the clinical area, they must demonstrate their respect for the students by notifying them of their departure and of when they will return. This is a model of behavior that students should want to emulate.

The way that instructors interact with patients is also a reflection of

their aspirations for their students. Clinical instructors have extraordinary responsibilities as role models: one careless action at chairside can undo hours of lecture about the dignity of patients.³ If instructors and clinical support staff treat patients with respect and concern, students will do the same.¹⁰ This also holds true for the instructors' interactions with clinical support staff and clinical administrators.

Effective clinical instructors must create a learning environment that includes structure, critical appraisal skills, objective observation and feedback on student performance, professional support, and encouragement.

This article has not presented all of the aspects of clinical undergraduate teaching, nor discussed many specific teaching techniques. It has not explicitly described how to give feedback or use active listening techniques. It has, however, challenged part-time clinical instructors to set meaningful teaching goals when they enter the clinic, and reminded them that theirs is an extremely difficult and complex task. ■

Acknowledgment: The authors express their appreciation to Dr. Calvin Torneck and to Ms. Annette Sciarra (McMaster University) for their help.

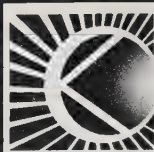
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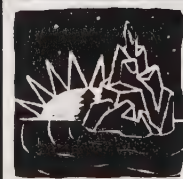


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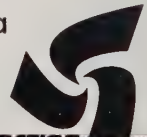
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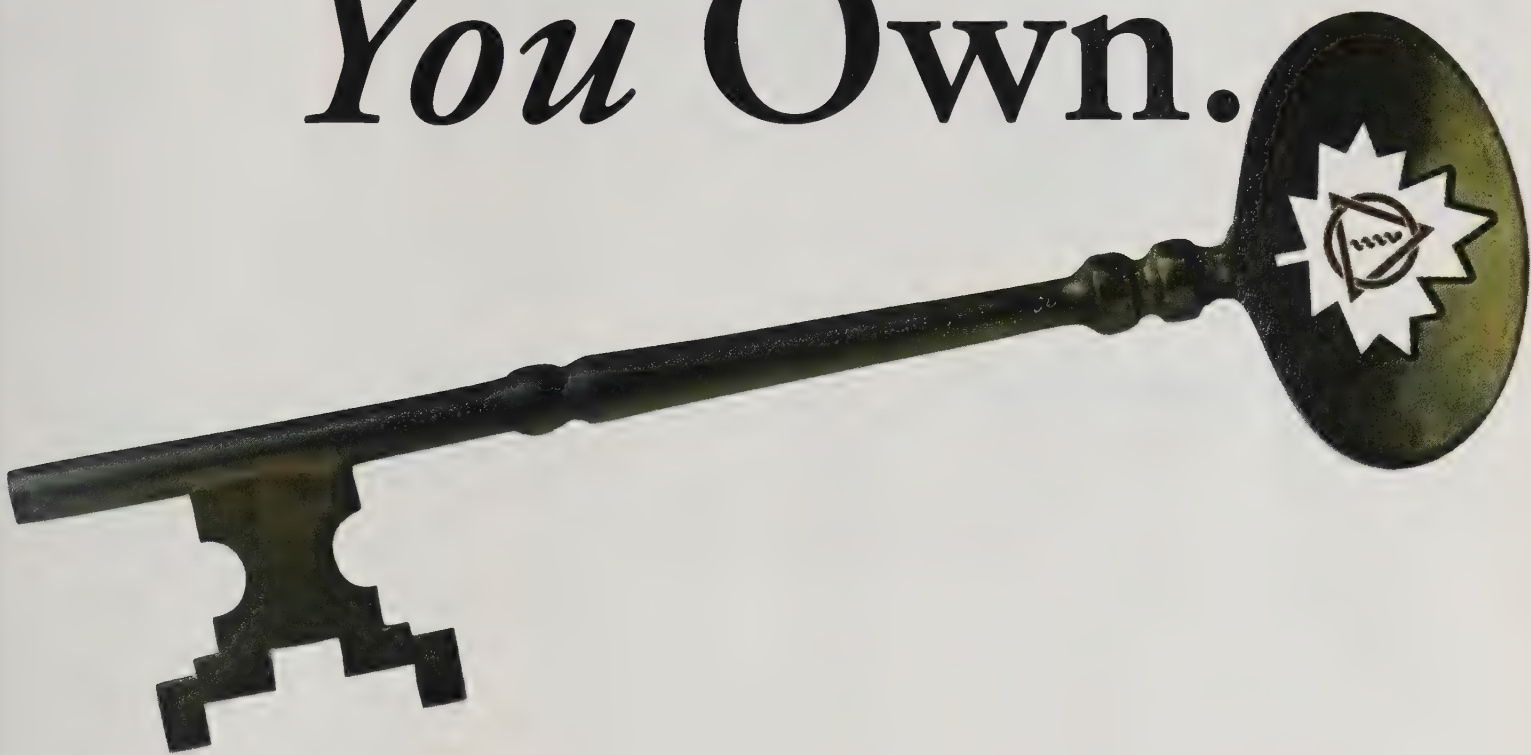


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Management Of Accidental and Iatrogenic Injuries To the Dentition

Lawrence W. Stockton, DMD

Mike Suzuki, DDS, DMD, MS

ABSTRACT

This article discusses the restoration of teeth with extensive fractures extending beyond the attachment of the periodontal ligament, as well as the treatment of iatrogenic perforations observed during post space preparation. Various treatment procedures and their limitations are described, based on the authors' many years of clinical experience.

Sub-Attachment Restorative Procedures

The modern trend towards increased leisure time, coupled with an attraction to accident-prone activities such as playing contact sports and driving fast-moving vehicles, has increased the prevalence of a wide variety of atypical dental fracture-type lesions. Restoring these lesions frequently challenges the skills of even the most experienced clinician.

At the outset of treatment, a thorough examination of the injured area is mandatory. Several questions should be asked to ascertain the patient's initial and/or future medical needs, as well as to identify potential legal implications. The clinician should determine how, where, and when the accident occurred. Intraoral photographs of the injury are recommended, as they may be required

as proof of injury for future insurance or legal claims. The soft tissues should also be thoroughly examined for wounds or the presence of foreign bodies, and all relevant observations should be recorded.

Particular care is required in the examination of the teeth, since enamel, dentin and/or pulp exposure, and/or cracked enamel demand different forms of treatment. Determine if the teeth have been bodily moved, the direction in which they have been moved, and to what extent the teeth are mobile. Once the site of the injury has been determined, occlusal and periapical radiographs should be taken to determine the extent of the fracture(s) (Fig. 1). It is also prudent to include a radiographic examination of the opposing dentition, since injury frequently extends beyond the primary site of trauma.

The treatment of a labial to lingual oblique fracture of an anterior tooth, which extends to the crest of alveolar bone, does not usually constitute a particularly demanding endodontic problem. However, the subsequent restoration of the injured tooth may present considerable difficulties.

Oblique fractures of this type occur primarily in the maxillary anterior teeth and premolars. They are often associated with impact forces, sustained during an accident, which were directed toward

the palatal area (e.g. steering wheel injury). As the crest of the alveolar bone acts as a fulcrum, the fracture line seldom goes beyond this level (Fig. 2). A frequent treatment approach is root extraction followed by a three-unit fixed prosthesis. The alternative, a removable partial denture, is often rejected because of its deleterious effect on the sub-adjacent soft tissue.

Although restoration with a three-unit fixed prosthesis and/or single implant may well be justified, the conservation of the affected tooth is mandatory in many cases:

- a) in the presence of a large diastema between the teeth;
- b) where the adjacent teeth are intact and have large pulp chambers typical of a young individual;
- c) in patients with a high lip line, no matter how perfect it is, a three-unit bridge would definitely compromise the appearance.

Using a well fabricated cast gold post and core to replace the lost cingulum, followed by a cast crown restoration, is the most conservative method of restoring an anterior tooth that has sustained a labial to lingual oblique fracture. The highly polished gold surface has been shown to discourage plaque accumulation.¹ As a result, no sign of chronic inflammation has been

identified in the palatal tissue surrounding the gold cingulum.

Proper endodontic treatment must be performed prior to the post and core procedure. Stabilization is also mandatory if the tooth is mobile, and is achieved by using acid-etch splinting to attach it to the adjacent teeth. The lost cingulum can be restored with a cast gold post and core. To gain access to the area, we recommend raising a trapezoidal mucoperiosteal flap (**Fig. 3**). It is extremely difficult to achieve proper access using electrosurgery alone, and the effort usually results in a radical reduction of soft tissue.

The flap incision should include at least three teeth. A black silk suture is used to retract the flap, and is then ligated to a rubber dam clamp secured on a posterior tooth. This frees up the assistant's hand from retraction, and will result in increased efficiency during the subsequent suctioning and wax-up procedures.

Side-cutting post drills or endodontic files can be used to prepare a post space that extends to within 4.0 mm to 5.0 mm of the root apex. Maximum preparation length is required to achieve adequate retention for the cast dowel. An anti-rotational slot should be incorporated into the post space preparation. This slot should be placed in an area where there is still an adequate thickness of dentin.^{2,3}

The best technique is to fabricate the pattern using a plastic endowel, self-curing acrylic resin (Duralay: Reliance Dental Manufacturing Co., Skokie, Ill.), and inlay wax. It is important to select a plastic dowel of the maximum possible diameter that will fit the prepared canal. Once this is done, the post portion should be lined with the self-curing acrylic resin. Using inlay wax for correction on the post portion provides a smoother, more accurately fitted casting.

The core portion of the post and core is eventually built up with acrylic resin. Some operators spend a lot of time trying to finish the post portion first. However, repeated seating of the pattern may cause inaccuracies before it is



Fig. 1: Radiograph indicates vestibular-lingual oblique fracture of the maxillary left central incisor.

ready to be invested. "Relining" the post pattern with inlay wax, as the final step in the pattern procedure, invariably results in a precisely fitted post with maximum resistance form.

The indirect preparation approach, which involves making an impression of the prepared tooth, is also acceptable. It is extremely difficult to identify the exact margin on the cast, however, and this approach will not reduce the amount of chairside time required to complete restorative treatment.

As oblique tooth fractures frequently involve the proximal root surfaces, poor accessibility often complicates restorative procedures. There is, therefore, a general consensus that bone recontouring may be necessary to establish a periodontally acceptable contour. Ramfjord⁴ advocates removing the smallest possible amount of bone at the alveolar crest that will permit the accurate placement and finishing of a restoration, allowing nature to determine the future new biologic width (i.e. it is not always necessary to remove bone beyond the fracture level). A reasonable compromise is to form a long junctional epithelial attachment rather than accepting further loss of bone.⁴

Following direct pattern fabrication, the flap is returned to its original position for suturing, and a temporary crown is stabilized with a temporary post.

A two to three week healing period is generally necessary before the patient is recalled for post

and core cementation. At the second appointment, access is secured by means of electrosurgery. The highly polished cast gold post and core (along with the pre-established lingual shoulder) is cemented prior to jacket crown restoration. Microetching the post, followed by the use of a self-curing resin cement to lute the cast post and core, are the generally accepted procedures.

At recall, the gingival tissue around the polished gold cingulum appears healthy. Fibrous tissue forms a tight adaptation at the cervix, although there can be no actual gingival attachment to the cast gold (**Fig. 4**). Careful plaque control on the part of the patient is therefore crucial to the maintenance of optimal gingival health in the area of the restoration.

In cases where a horizontal fracture extends beyond the periodontal attachment, restoration is extremely difficult. Extrusion of the remaining root by orthodontic means and/or surgical crown lengthening is suggested by some authors.^{5,6} This may result in a very poor crown to root ratio, however, and it is often necessary to splint the affected tooth to its adjacent neighbors. If this is the case, root removal followed by the placement of a three-unit fixed prosthesis or implant is probably the better choice of treatment.

Iatrogenic Perforations During Post-space Preparations

Approximately 50 per cent of root canal perforations occur during post-space preparation.⁷ The prognosis for teeth with perforations ranges from poor to good. Small supra-gingival crown perforations probably have little effect on treatment outcome. Perforations in the coronal half of the root have the poorest prognosis, and apical perforations fall somewhere in between.⁷⁻⁹ The treatment of perforations located in the coronal portion of the root, and extending into the interproximal area, is shown in **Fig. 5**.

In the past, posts were thought to reinforce endodontically treated teeth. The rationale was that the

placement of a metal alloy post in a tooth would make both the tooth and the subsequent restoration stronger. However, subsequent research has shown that posts do not reinforce teeth, and may actually weaken some teeth.^{10,11} It is now recognized that the main reason for using posts is to connect the replacement for the missing coronal portion of the tooth to the remaining root structure, thereby providing retention for the crown.^{10,11}

The most prevalent types of mishaps that occur during post-space preparation are due to over-sized preparations and the use of end-cutting drills.¹¹ A review of the preparation technique therefore seems appropriate.

Post-space preparations should be performed with safe instruments that are not end-cutting.⁷ The safest approach is likely to remove gutta percha with a heat carrier. If necessary, the post-space should then be enlarged, parallel with the long axis of the tooth, using successively larger endodontic files to achieve the desired diameter.^{7,8} To prevent microleakage, the post must be fitted within 0.5 mm of the gutta percha fill. A periapical radiograph, taken before cementation, confirms the position of the post.⁸

Researchers have not determined the ideal post length — common guidelines indicate that 4.0 to 5.0 mm of gutta percha must remain undisturbed, and that the post length should be equal to the anatomic crown, or one-half to two-thirds as long as the remaining root, and/or half the length of the root contained within bone.^{11,12}

The research seems to be much more clear with respect to post width. Most authors indicate that an increase in the width of the post has very little effect on post retention, but dramatically increases the risk of root perforation.

Again, the preservation of tooth structure is of prime importance. There is little indication for increasing the post space beyond what is needed for endodontic cleaning and shaping procedures. However, there should be at least 1.0 mm (some suggest 1.5-2.0 mm)¹³ of remaining tooth structure between



Fig. 2: Fractured crown portion of the tooth recovered from the case on Fig. 1.



Fig. 3: The palatal flap retracted and sutured to allow adequate access to the extent of the fracture on the lingual surface of the tooth.



Fig. 4: Cast gold post and core in place ready to receive a crown. Note the excellent tissue health around the cast gold post and core.

the wall of the prepared canal and the outer root surface according to many researchers.¹¹⁻¹⁴

A review of the literature indicates that, if a post is required, the MB and ML canals of lower molars and the MB canals of upper

molars should be used only in very exceptional cases.¹⁵

As clinicians, we can dramatically reduce the number of perforations that occur by reviewing and altering our techniques for post-space preparation. However, once it is recognized that a perforation has

occurred, studies indicate that the repair of procedural accidents is more likely to be successful if it is done as soon after recognition as possible, and before destructive lesions develop.^{7,16}

The size of the perforation and its sealability can also affect treatment outcomes. It is of prime importance to achieve a good seal between the tooth and repair material. The seal can be affected by the location and size of the perforation, as well as by operator skill and the repair material used.^{8,9} Studies have suggested that mineral trioxide aggregate^{9,22} and super EBA cement (Harry J. Bosworth Co., Skokie, Ill.) may be preferred over IRM (Dentsply International Inc., Milford, Del.), Amalgam, Cavit (ESPE-America, Norristown, Pa.), and glass ionomer.^{9,17,18,22}

It can be very difficult to achieve a favorable outcome when perforations occur at the cervical level, because of the likelihood that they will cause periodontal breakdown. The ideal objective of treatment is to repair the perforation without preventing the re-establishment of the epithelial attachment. Whether or not this result is achieved will largely depend on the position of the perforation and its size, however.^{7,9}

When the perforation in a tooth is identified immediately apical to an intact epithelial attachment, a very delicate situation exists. An attempt to surgically repair such defects will almost certainly result in a loss of the epithelial attachment. However, on some occasions surgical repairs of this type have been made without loss of the attachment.

Achieving an ideal repair depends on externalizing the defect, so that re-attachment can occur further apically on the root. Two possible techniques are: to apically reposition the flap after appropriate osseous recontouring and root repair; and orthodontic forced eruption. The latter technique is limited by its complexity, cost, the amount of time required to complete treatment, the need to provide stabilization, and the fact that the crown to root ratio will be compromised.¹⁹

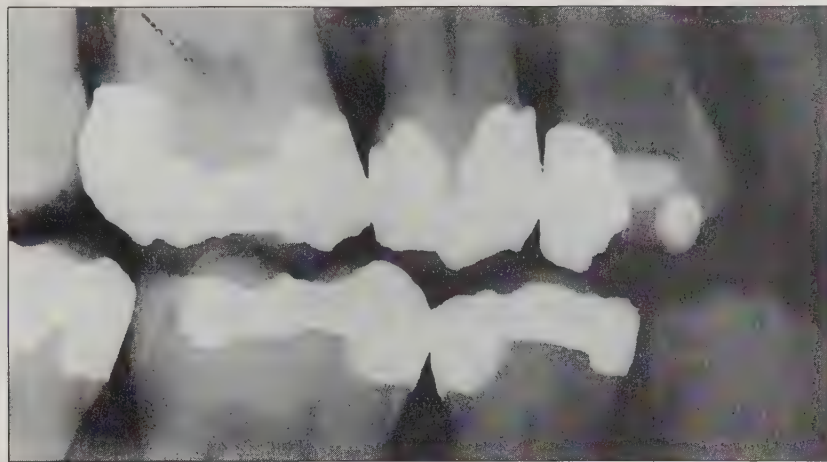


Fig. 5: A proximal perforation that occurred during endodontic access preparation on the maxillary first bicuspid.

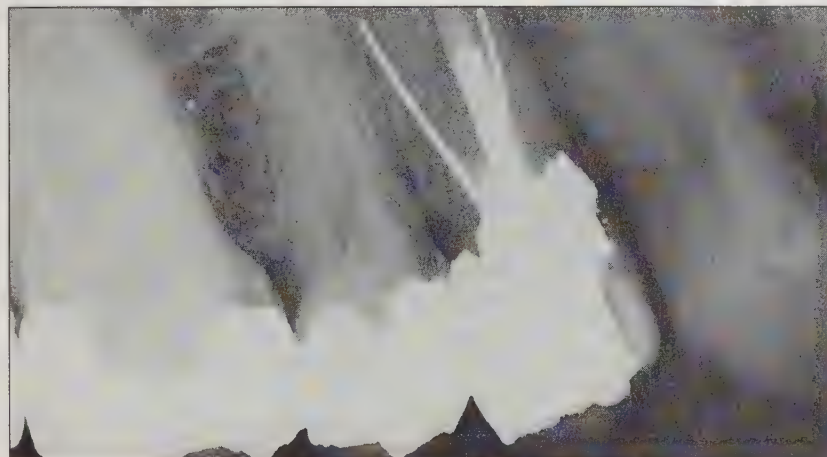


Fig. 6: The perforation has been repaired and sealed with silver amalgam.



Fig. 7: Seventeen year recall. Note how the bone level on the mesial surface adjusted to create a new biological width.

The surgical procedure requires a sulcular incision and a full thickness flap, which should include two teeth on either side of the perforated tooth, along with two vertical relaxing incisions to allow reflection along the facial aspect.

Using a new periapical radiograph of the perforation, bone is removed to expose the perforation site. A Class III preparation design

is created with mechanical retention¹⁶ (**Fig. 6**). Hemorrhage control is essential to obtain an effective seal, as the currently available restorative materials are recommended for use in dry fields only.⁹ Once the perforation has been sealed, the interproximal bone must be recontoured to provide proper anatomical contour, and the flap must be repositioned apically,

using 5-0 sutures, to conform to the new osseous height.¹⁶

Repairing the defect with an insoluble material that effectively seals the perforation may influence treatment success (studies on amalgam indicate that the initial good seal is not maintained).¹⁸ Super EBA cement is frequently recommended for this procedure. Secondary isolation of the repair using a chelating type base with low solubility, such as zinc polycarboxylate, may enhance the prognosis. Completing the entire procedure using an aseptic technique, as quickly as possible after locating a perforation, is also essential to success.¹⁶

Extruded filling material is a potential problem in repairing root perforations. During intracoronary condensation, this type of operator error can cause traumatic injury to the surrounding periodontal ligament, resulting in sustained inflammation and delayed treatment. An extra-coral surgical approach enhances the prognosis.⁹

It is prudent to schedule follow-up evaluations for at least two years posttreatment⁷ (Fig. 7).

Some types of periodontal bone loss are being treated successfully using guided tissue regeneration (GTR) procedures, and early studies indicate there may well be a place for GTR in endodontic surgery.²⁰

Perforations that occur in the radicular areas of lower molars, for which the prognosis of successful surgical repair is deemed to be poor, can often be treated very successfully by hemisection provided that the periodontal health of the tooth is favorable.²¹ We recommend the placement of a pre-formed post and core prior to hemisection, as placement after hemisection is exceedingly difficult. Once healing is complete, full coverage crowns can be fabricated, and the prognosis is generally very good.

Summary

The management of extensively fractured anterior teeth and iatrogenic perforations during post-space preparation have been discussed both from the preventative and treatment aspects.

Emphasis must be given to prevention, because the treatment of these lesions is compromising at best. There are a variety of factors that affect prognosis, all of which are of significant importance.

The location of the fracture site is the most crucial factor for the prognosis of the fractured tooth. With iatrogenic injuries, since the lesion is not a periodontitis, and assuming the periodontal health of the patient and in particular the perforated tooth is good, there is every likelihood for success. However, if the tooth is already compromised periodontally or restoratively, the decision to root amputate, hemisection, or extract must be considered. ■

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Abstracts Of Oral and Poster Presentations Made By Canadian Researchers At the AADR / CADR Meeting, Minneapolis 1998

Editor's note

In this issue of the *Journal*, we have reprinted nine abstracts that were first published in the *Journal of Dental Research* (Volume 77, Special Edition A, 1998). They are representative of work presented by Canadian dental researchers at the joint meeting of the American and Canadian Associations for Dental Research, which was held in Minneapolis, Minnesota from March 4 to 7. The reprinted abstracts all relate to the area of dental materials.

We are taking this initiative for two main reasons. First, we want to highlight the fact that high quality dental research is being conducted in Canada and presented internationally. Second, we hope to send out a signal that the *Journal* wants to publish more original applied research papers in the field of dental materials. This is a rapidly evolving topic area, and Canadian dentists have expressed a desire to read good, evaluative research that will help them to make informed decisions when they are choosing dental materials.

Influence Of Composite Inlay Thickness On Polymerization Of Dual-cured Resin Cements

M.H.M. Rubo and O.M. El-Mowafy (Faculty of Dentistry, University of Toronto, Ont., Canada)

The increasing demand for esthetic restorations in the last decade led to the development of inlays and onlays made of resin composite and ceramic. This was possible because of recent developments in bonding techniques which allowed resin cements to bond to both dentin and enamel as well as inlay surfaces. Dual-cure resin cements have light-curing and chemical-curing components and, therefore, should be able to achieve maximum polymerization even in areas not readily reached by light. The aim of this study was to determine the efficiency of the chemical-curing component of resin cements under varying inlay thickness.

Discs 6 x 2.5 mm were prepared from cements: Adherence M5 (ADH), Choice (CHO), Duolink (DUO), Enforce (ENF), Lute-It (LUT), Nexus (NEX), Resinomer (RES), and Variolink (VAR). Sixteen specimens were made from each cement. Twelve were dual-cured through resin composite spacers of varying thickness (1-6 mm) and four were dual-cured with no spacer. Knoop hardness measurements were then made at 1h, 1d and 1w intervals.

ANOVA showed significant differences in mean hardness values among materials ($p < 0.0001$), spacer thickness ($p < 0.0001$) and time ($p < 0.0001$). The hardness value achieved with no spacer after 1d was: LUT - 57.0, DUO - 55.9, ENF - 51.4, NEX - 50.8, VAR - 50.1, CHO - 45.8, RES - 44.3 and ADH - 44.1. All materials had significant decreases in hardness with spacers of 3 mm or more. For 1d interval, the value dropped 48 per cent for LUT and DUO, 42 per cent for ADH, 21 per cent for VAR and CHO, 16 per cent for NEX and 12

per cent for ENF and RES. For some cements further reductions in hardness occurred with thicker spacers. There was no difference in hardness values between 1d and 1w for most materials, except CHO and VAR.

It is concluded that for some dual-cure cements a weak chemical-curing component fails to enable the cement to reach optimum hardness with thick composite inlay spacers.

This study was supported in part by CAPES-Brazil. Grant no. 1783/95-4.

Microleakage In Class 2 Resin Composites With Low-modulus, Intermediate Materials

P.R. Walshaw and D. McComb (Faculty of Dentistry, University of Toronto, Canada)

The aim of this study was to investigate the efficacy of (a) a dentin bonding agent, All Bond 2 (Bisco) with a flowable hybrid composite, Flowit (Jeneric Pen-tron) or (b) a resin-modified glass ionomer, Fuji Bond (GC Corp.) as a low-viscosity, intermediate layer to absorb polymerization stress and reduce microleakage in Class 2 resin composite restorations. A dentin bonded resin composite provided a control (c).

Sixty-two standard Class 2 cavities extending below the cemento-enamel junction were cut, mesially and distally, in 31 recently extracted human molars. Mesial and distal cavities were treated with different combinations of (a), (b) or (c) and restored incrementally with Prisma TPH Spectrum (Dentsply Caulk). Specimens were stored in water at 37° for 36 h, thermocycled 300 x and immersed in 2 per cent methylene blue for 24 h at 37° C. Serial 600 μ m sections were evaluated for microleakage. Selected specimens and replicas were viewed under SEM. Technical difficulties of applying a uniform thickness of liner influenced bonding efficacy.

Chi square analysis of the microleakage scores showed that Fuji Bond was significantly more effective in reducing microleakage [$p < .001$]. This was confirmed by Anova. Duncan's Multiple Range test showed no significant differences between bonded restorations with or without the intermediate flowable hybrid composite. SEM results confirmed the gap-free adaptation of Fuji Bond when an optimal thickness ($> 100 \mu$ m) was present.

Retention and Shear Bond Strength Of 2 Post Systems *In-vitro*

L. Stockton and P. Williams (Faculty of Dentistry, University of Manitoba, Canada)

The purpose of this study was to compare the retention and shear strength of teeth restored with the Para-Post Plus (P) and the C-Post (C) systems.

Twenty-six P and 26 C posts were placed 7 mm into recently extracted and endodontically treated human maxillary anterior roots and luted with Ketac-Cem and Bis-Core respectively. In addition, half the samples of

each post type had a Bis-Core composite core placed. The tensile retention strength of the posts and the shear strength of the post-and-core restorations when the core was loaded bucco-lingually at 45° to the roots long axis was determined at a strain rate of 1.3 mm/min.

RESULTS: The C posts required significantly more tensile force ($P < 0.0001$) to remove them than the P posts ($C = 31.3$ kg; $P = 9.1$ kg). The shear strength of the post/core restoration ($C = 25.8$ kg; $P = 23.7$ kg) was not significantly different ($P < 0.4$). The C restorations had 11 root fractures compared to six for the P restorations.

We conclude that as a result of the high number of fractures, the C-Post and core system not be used in conjunction with a crown that is solely supported by the post and core.

Interface Fracture Toughness and Stiffness Of Dentin Bonded Adhesive Interfaces

S. Khoshand, L.E. Tam and R.M. Pilliar (Faculty of Dentistry, University of Toronto, Canada)

The dentin-composite interface should withstand stresses which develop initially during composite polymerization and later during clinical function. The recommendations for the use of a thick or filled low-viscosity adhesive layer at the dentin-bonded interface, based on presumed improved strain energy absorption capacity compared to that of a thin adhesive layer needs investigation. The purpose of this study was to measure the interfacial fracture toughness (int-K_{1C}) and the relative interfacial stiffness properties of dentin-composite interfaces containing different adhesive layers.

The mini short-rod specimen geometry (JDR 72:953-959, 1993) was used for testing. For all the groups, the dentin surface was prepared by using one of two dentin bonding agents [All-Bond 2 (AB2, Bisco) or Clearfil LB 2 (CLB2, J. Morita) etchant and primer.] A "thin" (air-thinned), "thick" (2 coats, no air-thinning) or "filled" (CLB 2) adhesive layer was then placed on the primed dentin surface. Specimens were aged in distilled water at 37° C for 24 hr or 30 days prior to testing at an extension rate of 0.5 mm/min. The int-K_{1C} and stiffness results were calculated from load-deformation curves obtained during testing of the fracture toughness specimens. ANOVA, Fishers LSD and simple linear regression tests were used for statistical analyses ($p \leq 0.05$).

The mean int-K_{1C} and stiffness results ranged between 0.28-0.67 $\text{MN} \cdot \text{m}^{3/2}$ and 3.0-7.7 kg/mm respectively. There were no significant differences in the mean int-K_{1C} and stiffness results between the "thin" and "thick" groups. The addition of the "filled" adhesive to either the AB2 or CLB2 conditioned dentin tended to decrease both the int-K_{1C} and stiffness results. The "filled" AB2 group after 30 days showed the significantly lowest mean int-K_{1C} and stiffness results. The results also showed a significant linear positive correlation between the int-K_{1C} and stiffness values. This would support the development of a stiffer, as opposed to a more flexible, dentin-composite interface for increased dentin-bond integrity.

A 4 Year Clinical Evaluation Of Zirconium Silica Contained Composite Resin Placed On the Posterior Dentition

M. Suzuki and D. Davidson (Faculty of Dentistry, University of Manitoba, Canada)

The purpose of this investigation was to evaluate the clinical performance of a zirconium silica contained composite resin placed on the posterior dentition.

All restorations were placed on molars which were participating in functional occlusion. Seventy-six restorations among 20 patients were available for four year recall. Seventy-eight per cent of the restorations were involving more than two surfaces of the anatomical crowns. The evaluations were carried out at zero, six months, one year, two years and four years according to the ADA acceptance program guidelines and M-L indirect scale.

RESULTS: Excellent color stability, maintenance of anatomical form and inter-proximal contact have been observed on all cases. Relative to marginal integrity, 46 (61 per cent) restorations were rated Alpha, 26 (34 per cent) Bravo, 2 (2.6 per cent) Charlie and 2 (2.6 per cent) Delta (Bulk Fracture). Those two failure cases occurred on the same quadrant of the same patient involving very large restorative surfaces. The amount of average general occlusal wear from the baseline was found to be 39 μm , ranging from 15 μm to 60 μm .

We conclude that based on the data obtained at four year recall, the composite material Z100 performed extremely well clinically and the average generalized occlusal wear was well within the allowable wear on composite resin placed on posterior dentitions established by the ADA.

This research was funded through the grant supported by 3M, St. Paul, MN.

A Long Term Clinical Evaluation Of a Heavy Filled Hybrid Composite Resin As a Posterior Restoration

D. Davidson and M. Suzuki (Faculty of Dentistry, University of Manitoba, Canada)

Acceptable durability of composite resin used in the posterior dentition requires long term clinical confirmation. The objective of this investigation was to clinically evaluate the use of a heavy filled hybrid composite resin known as Prisma TPH as posterior restorations for a period of four years.

Sixty-three restorations among 21 patients were available for recall after four years. Evaluations were carried out at six months, one, two and four years according to the ADA acceptance program guidelines and M.L. indirect scale.

RESULTS: Excellent color stability, maintenance of anatomical form and interproximal contact have been invariably observed. Relative to marginal integrity 20 of the sample (32 per cent) exhibited slight marginal catches (Bravo). One restoration (1.6 per cent) advanced from Bravo to Charlie during the 2-4 year observation period. There were no bulk fractures or dislodgement of the restoration. Secondary caries interproximally at the gingival margin were exhibited in two side by side teeth (3 per cent Charlie). This was not identified at the two

year recall and reflected less than ideal oral hygiene maintenance by the patient during that period. Average general occlusal wear from baseline was found to be $43\text{ }\mu\text{m}$ ranging from $15\text{ }\mu\text{m}$ to $60\text{ }\mu\text{m}$.

Our conclusion based on four year recall was that the composite material Prisma TPH performed exceptionally well clinically and average occlusal wear was well within that allowed by the ADA relative to composite resin on posterior dentition.

This research was funded by Dentsply Caulk.

Effect Of a Wetting Agent On Composite Bond Strength To Dentin

J.J.D. Fortin and Ly Thy Mar (Université de Montréal, Montréal, PQ, Canada)

New bonding agents based on the total etch concept rely upon the penetration of resin into dentin surfaces treated with demineralizing agents. A relatively wet surface has been shown to increase bond strength to dentin. This study was designed to determine whether the application of a wetting agent to wet or to re-wet dentin surface would have any effect upon the bond strength of composite to dentin.

Forty recently extracted human molars were cleansed, flattened occlusally to remove all enamel and polished through 600 grit silicon carbide before mounting in phenolic rings with acrylic. Group 1: was bonded with (OS) One-Step (Bisco) on a dry dentin surface. Group 2: was bonded with (OS) on a shiny wet dentin surface. Group 3: a dry dentin surface was treated with (A) Aqua-Prep followed by (OS). Group 4: a wet dentin surface was treated with (A) followed by (OS). After application of wetting and/or adhesive resin according to manufacturer's instructions a gel cap filled with composite resin (AeliteFill, Bisco) was bonded and light cured for 160 sec. The specimens were stored in distilled water for five days. Then they were shear loaded (5 mm per min.) in an Instron materials testing machine, until fracture.

The mean shear bond strengths (in MPa) were: Group 1, $9.69 (\pm 6.4)$; Group 2, $12.67 (\pm 4.2)$; Group 3, $15.79 (\pm 4.21)$; Group 4, $18.63 (\pm 2.48)$. Two way ANOVA indicated that there was significant difference between treatments ($P > 0.025$). Application of a wetting agent to dry and wet surface increased adhesion of composite to dentin.

Mechanical Properties of Commercial and Experimental Composites

*D.W. Jones, A.S. Rizkalla and G.C. Hall.
(Div. Biomaterials, Dalhousie University, Halifax, Nova Scotia, Canada)*

Objective: To evaluate and compare modulus of elasticity for six commercial and four experimental composite materials. The six commercial materials evaluated were Herculite™, P-50™, Silar™, Silux Plus™, TPH™ and Z-100™.

The test specimens were discs 20.5 mm diam. x 1.6 mm thick ($n=3$). Dynamic modulus of elasticity was determined using longitudinal and shear wave lithium niobate crystals and an ultrasonic wave of 10 MHz resonant frequency. The tests were conducted

in air following storage in distilled water at 37°C for 4 weeks. The four experimental composite systems contained between 10 and 79 per cent ceramic filler which had been synthesized by wet chemistry.

The dynamic modulus of the four experimental composites with the maximum filler loading were significantly different ($P = 0.05$). Significant differences in elastic modulus were found among the six commercial materials ($P = 0.05$). The commercial materials had values for bulk modulus ranging from 9.05 ± 0.07 to 20 ± 0.21 GPa; the experimental materials ranged from 8.68 ± 0.33 to 13.76 ± 0.08 GPa. The Poisson's ratio for the experimental materials ranged from 1.49 ± 0.01 to 1.89 ± 0.01 , and the commercial materials ranged from 1.57 ± 0.02 to 2.29 ± 0.01 .

The highest bulk modulus of the experimental materials was significantly greater than four of the six commercial materials ($P = 0.05$). Excellent correlations were found between the filler loading and elastic moduli for the experimental composite systems ($p < 0.01$). The dynamic modulus test provides a very sensitive method for comparing mechanical properties of resin/ceramic composite systems.

Fluoride Release In Experimental and Commercial Materials

*A. S. Rizkalla, D.W. Jones and M. Langman.
(Div. Biomaterials, Dalhousie University, Nova Scotia, Canada)*

Objective: To evaluate and compare fluoride release for 10 experimental resin ionomer materials and four commercial resin ionomer materials (Advance™, Variglass™, Vitrebond™ and Vitremer™). In addition two experimental and three commercial conventional glass ionomer materials (Aqua Cem™, Fuji I™ and Ketac Cem™) were evaluated.

The disc specimens 20.5 mm diam. x 1.6 mm thick ($n=3$) were stored in 25 ml deionized distilled water in sealed plastic containers at $37^\circ \pm 2^\circ\text{C}$ in a shaker bath (1.43 Hz). Storage water was analyzed using a standard F electrode technique. F release was measured from 48 h to 2,040 h. All values were corrected for volume and the weight was calculated.

The release rate for the experimental materials at 2,040 hours was significantly different for the experimental materials with different filler loading ($p = 0.05$). The fluoride release rate for the experimental conventional glass ionomer materials was significantly higher than both the commercial conventional glass ionomer materials as well as the 10 experimental resin/ionomer materials ($p = 0.05$). The fluoride release rate from Vitrebond was significantly higher than for the other commercial resin ionomer materials ($p = 0.05$). The fluoride release rate for the experimental conventional ionomer materials was independent of the fluoride content of the glass. The release rate for the experimental resin ionomer systems was a function of the filler content.

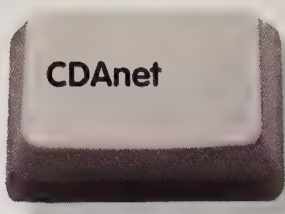
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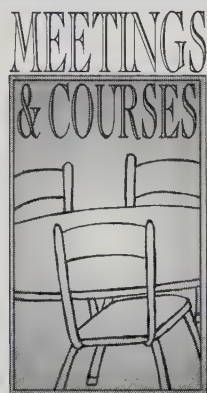


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INTERNATIONAL



June 25-27

5th Dental International Congress of the Turkish Dental Association in Bursa, Turkey. Contact Chamber of Dentists of Bursa, Altıparmak Cad. Petek Ish. K.4, Bursa, Turkey. Tel.: 90 (0) 224-222-69-69; fax: 90 (0) 224-223-53-59.

July 2-4

1st Chinese International Conference on Comprehensive Orthodontics in Nanjing, China. Contact Javisa International Ltd., 425 University Ave., Suite 301, Toronto, ON M5G 1T6. Tel. (collect): (416) 595-9877; fax: (416) 595-9565.

August 25-29

15th Jubilee "Ákrövy" Congress of the Hungarian Dental Association in Budapest, Hungary. Contact MOTESZ Congress Bureau, 1051 Budapest, Nádor u. 36., 1443 Budapest, Pf. 145 Hungary. Tel.: (36-1) 111-66 87; fax: (36-1) 183-79 18; e-mail: motesz@mail.elender.hu; internet: www.motesz.hu.

August 26-30

1998 New Zealand Dental Association Conference in Wellington, New Zealand. Contact Dr. W. Gaudie, Conference Secretariat, P.O. Box 5321, Wellington, NZ. Tel.: +64 4 384 7606; fax: +64 4 384 6594; e-mail: wmgaudie@clear.net.nz

September 8-11

135th British Pharmaceutical Conference in Eastbourne, England. Contact BPC Secretariat, Royal Pharmaceutical Society of Great Britain, 1 Lambeth High St., London SE1 7JN, U.K. Tel.: 44 (0) 171 820-3241; fax: 44 (0) 171 735-7629.

October 1-3

3rd International Congress On Dental Law and Ethics in London, England. Contact Congress Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855.

October 8-12

86th Fédération Dentaire Internationale Annual World Dental Congress in Barcelona, Spain. Contact the Canadian Dental Association. Tel.: (613) 523-1770; 1-800-267-6354; fax: (613) 523-7736.

October 15-17

Microscope & Future — Multidisciplinary Symposium On the Use Of Microscopic Dentistry in Rome, Italy. Contact Mrs. Paola Mercaldo, G&G Congressi, 00143 ROMA, Via Tommaso Arcidiacono, 87, Italy. Tel.: 39 (06) 5043441 - 5043442; fax: 39 (06) 5033071.

CANADA



June 5-6

Clinical Endodontics in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

June 12

Annual Meeting of the Quantum Study Club in association with The

Association of Prosthodontists of Canada in Montreal, Que. Contact Dr. Michael Moscovitch, President of the Quantum Study Club, 370-4150 St. Catherine St. W., Westmount, QC H3Z 2Y5. Tel.: (514) 935-5211; fax: (514) 935-5261; e-mail: mospros@aol.com

June 13

Techno Endodontics — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

June 14-17

Canadian Nurses Association's Biennial Convention and 90th Anniversary in Ottawa, Ont. Contact Patricia Mohr, conference coordinator. Tel.: 1-800-351-8404; fax: (613) 237-3520; e-mail: conferences@cna-nurses.ca

June 17-20 and July 8-9

Cosmetic Dentistry in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

June 19-21

9th Annual Professional Conference of the Canadian Dental Hygienists Association in Charlottetown, PEI. Contact Shirley Verheyden, Conference Coordinator. Tel.: (613) 820-0084.

July 10-17

I.V. Conscious Sedation in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.



July 13-15

Forensic Odontology: Behind Every Story There is a Grain of Tooth — presented by the Summer Institute of Forensic Sciences in Ottawa, Ont. Instructors: David Sweet and Dean Hildebrand. Contact the School of Continuing Education, 302 Robertson Hall, Carleton University, 1125 Colonel By Drive, Ottawa ON K1S 5B6. Tel.: (613) 520-3500; fax: (613) 520-4456.

July 16-19

Annual Meeting of the Canadian Association of Oral and Maxillofacial Surgeons in Vancouver, B.C. Contact CAOMS/ANZAOMS Secretariat, c/o Water Street Planning Group, Third Floor, 353 Water St., Vancouver, BC V6B 1B8. Tel.: 1-800-549-3301 (in Canada only), fax: (604) 681-1292.

July 30 - August 1

Aesthetics '98 — International Symposium on Excellence in General Practice and Aesthetic Dentistry in Whistler, B.C. Contact Ms. Debbie Larocque, McGill University. Tel.: (514) 398-7203, ext. 4165; fax: (514) 398-8900. Or contact Ms. Olga Chodan, tel.: (514) 398-7221.

August 26-29

34th Annual General Meeting of The Canadian Academy of Endodontics in Charlottetown, PEI. Contact Dr. Wayne A. Maillet. Tel.: (902) 494-5129; fax: (902) 494-2527; e-mail: w.maillet@dal.ca

September 10-12

6th Annual Meeting of The Canadian Academy of Restorative Dentistry and Prosthodontics in Winnipeg, Man. Contact Ms. Barb Malinowski, Executive Secretary to the CARDP 1998 Convention Chairman, 5-2230 McPhillips St., Winnipeg, MB R2V 3C8. Tel.: (204) 694-2042; fax: (204) 694-4052.

September 11-12

Partial Denture Design... Fundamentals with an Eye to Esthetic. Guest lecturers: Dr. Davis Charles

and Dr. Paul Sills. Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

September 11-13

Northern Ontario Dental Association Annual Convention in Timmins, Ont. Contact Dr. Don Francis. Tel.: (705) 264-9559; fax: (705) 264-2585.

September 19

Dental Materials Update — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

September 25-27

Annual Meeting Of the Canadian Academy Of Pediatric Dentistry in Calgary, Alta. Pediatric restorative materials. Presenter: Dr. Donly, University of Iowa. Contact Dr. Robert Barsky, 507-4600 Crowchild Trail N.W., Calgary, AB T3A 2L6. Tel.: (403) 247-3166; fax: (403) 247-2534.

October 2-3

Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632; fax: (519) 258-2637; e-mail: jberger@mnsi.net

October 2-3

What's New in Oral Health in Halifax, Nova Scotia. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5. Tel.: (902) 494-1674; fax: (902) 494-2527.

October 17

Prosthodontic Series #1 - Porcelain Fused to Metal Prosthesis — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Profes-

sional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

October 23-24

Thompson Okanagan Dental Meeting in Kelowna, BC. Contact Alison Hall, Registration Coordinator. Tel./fax: (250) 832-2811; e-mail: alison@sunwave.net

October 30-31

Clinical Perio Series - Course #210 - Periodontal Surgery Workshop — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

November 8-13

Bermuda Symposium #6... Southampton Princess — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

November 21

Clinical Perio Series - #220 - Clinical Periodontics for Dental Teams — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

December 4-5

Annual Meeting of the Association of Prosthodontists of Canada in association with **The Greater New York Academy of Prosthodontics** in New York, NY. Contact Ms. Jennifer Rogers. Tel.: (905) 305-9373; fax: (905) 886-8913.

December 5

Prosthodontics Series #2 - Bonded Protheses — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

UNITED STATES



August 5-8

23rd American Academy of Esthetic Dentistry Annual Meeting: The Pursuit of Esthetic Excellence in Philadelphia, Pa. Contact AAED Headquarters, 1807 S. Washington St., Suite 106, Naperville, IL 60565. Tel.: (630) 355-0424; fax (630) 355-0474.

September 13-18

84th Annual Meeting of the American Academy of Periodontology in Boston, Mass. Contact Melodie at (312) 573-3210; e-mail: melodie@perio.org

September 16-19

28th Annual Session of the American College of Prosthodontists — Current Controversies In Prosthodontics in San Diego, Calif. Contact ACP, 211 E. Chicago Ave., Chicago IL 60611. Tel.: 1-800-378-1260.

DENTAL MEETINGS



May 7-9

ODA/CDA National Convention in Toronto, Ont. Contact Ms. Patricia Brennan. Tel.: (613) 523-1770, ext. 246, or 1-800-267-6354; fax: (613) 523-3062.

May 23-27

27e Congrès annuel de l'Ordre des dentistes du Québec in Montréal, Que. Contact Dr. Denis Forest. Tel.: (514) 875-8511; fax: (514) 875-1561.

May 29-30

New Brunswick Dental Society Annual Meeting in St. Andrews, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; fax (506) 452-1872.

June 4-6

Prince Edward Island Dental Association Annual Meeting in Woodstock. Contact Ms. Nettie Likely. Tel.: (902) 566-5199; fax: (902) 892-4470.

June 8-14

92nd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. Robert Mast. Tel.: (403) 346-7331; fax (403) 342-0133.

June 12-13

Nova Scotia Dental Association Annual Meeting in Yarmouth, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; fax: (902) 423-6537.

June 18-20

Newfoundland Dental Association Annual Meeting in St. John's, Nfld. Contact Dr. Gary Butler. Tel.: (709) 368-1431; fax (709) 364-1770.

June 18-20

Annual Scientific Session of the College of Dental Surgeons of Saskatchewan in Saskatoon, Sask. Contact Dr. Damara Rayner. Tel.: (306) 978-1700; fax: (306) 978-1732.

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The absorption of clindamycin is not appreciably affected by food intake. Peak serum levels following a single 250 mg oral dose of clindamycin with the patient in the fasting state were 3.1 mcg/mL at 45 minutes whereas the same dose administered with food gave a peak level of 2.4 mcg/mL. A 250 mg dose administered one hour after food gave a peak level of 2.8 mcg/mL but this peak did not occur until two hours after administration of the medication. A 250 mg dose with the patient in a fasting state and with food administered one hour after the medication resulted in peak levels of 3.1 mcg/mL at 1 1/2 hours.

Excretion

The 48 hour urinary excretion of clindamycin in adults following a single dose of 150 mg represented 10.9% of the administered dose (range 4.8% to 12.8%). These measurements were made by bio-assay and both the percent recovered and the urinary concentration are quite variable. The urinary concentration following a single 50 mg dose of clindamycin in the first 24 hours ranged from 8 to 25 mcg/mL of urine.

Fecal excretion of clindamycin has also been determined. Patients on a three week study when administered 1 gram of clindamycin per day had an average of 283 mcg/gm of stool. Patients on lincomycin 2 grams per day under the same conditions showed 3980 mcg/gm of stool. In single dose studies following administration of 250 mg of clindamycin, only 2.7% of the dose was excreted in the feces in 48-96 hours.

Tissue Penetration

In three patients following the administration of 150 mg of clindamycin serum levels reached 2.25 mcg/mL in 2 hours and declined to 1.5 mcg/mL at 4 hours. During this period antibiotic synovial fluid levels were 1 mcg/mL at 2 hours and remained unchanged for the next and last 2 hours of observation.

Various other body fluids and tissues were also assayed for clindamycin and the results of these assays and serum levels at the same time are recorded in Table 1.

TABLE I

Specimen	No. of Specimens	Average Serum Level	Average Fluid Level mcg/mL	Tissue Level mcg/g
Pancreatic fluid (C6-264)	4	1.15	45.1	
Bile (C6-264)	19	3.35	52.45	
Gall Bladder (C6- 24)	16	0.81		4.33
Liver (C6-265)	1	42.35		3.80
Kidney (C6-265)	1	1.50		9.07
Bone (C4-390)	2	2.44		9.91

INDICATIONS AND CLINICAL USE

Dalacin C (clindamycin hydrochloride) is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *bacteroides* species, *peptostreptococcus*, anaerobic streptococci, *clostridium* species and microaerophilic streptococci.

Dalacin C is also indicated in serious infections due to sensitive gram-positive organisms (staphylococci, including penicillinase-producing staphylococci, streptococci and pneumococci) when the patient is intolerant of, or the organism resistant to other appropriate antibiotics.

DALACIN C is indicated for prophylaxis against alpha-hemolytic (viridans group) Streptococci before dental, oral and upper respiratory tract surgery.

a) The prophylaxis of bacterial endocarditis in patients allergic to penicillin with any of the following conditions: congenital cardiac malformations, rheumatic and other acquired valvular dysfunction, prosthetic heart valves, previous history of bacterial endocarditis, hypertrophic cardiomyopathy, surgically constructed systemic-pulmonary shunts, mitral valve prolapse with valvular regurgitation or mitral valve prolapse without regurgitation but associated with thickening and/or redundancy of the valve leaflets.

b) Patients taking oral penicillin for prevention or recurrence of rheumatic fever should be given another agent such as clindamycin, for prevention of bacterial endocarditis.

CONTRAINDICATIONS

As with all drugs, the use of Dalacin C (clindamycin hydrochloride) is contraindicated in patients previously found to be hypersensitive to this compound. Although cross-sensitization with Lincocin® (lincomycin hydrochloride) has not been demonstrated, it is recommended that Dalacin C not be used in patients who have demonstrated lincomycin sensitivity.

Until further clinical experience is obtained Dalacin C is not indicated in the newborn (infants below 30 days of age), or in pregnant women.

WARNINGS

Some cases of severe and persistent diarrhea have been reported during or after therapy with Dalacin C (clindamycin hydrochloride). This diarrhea has been occasionally associated with blood and mucus in the stools and has at times resulted in acute colitis. When endoscopy has been performed, some of these cases have shown pseudomembrane formation.

If significant diarrhea occurs during therapy, this drug should be discontinued or, if necessary, continued only with close observation. Significant diarrhea occurring up to several weeks post-therapy should be managed as if antibiotic-associated.

If colitis is suspected, endoscopy is recommended. Mild cases showing minimal mucosal changes may respond to simple drug discontinuance. Moderate to severe cases, including those showing ulceration or pseudomembrane formation should be managed with fluid,

electrolyte, and protein supplementation as indicated. Corticoid retention enemas and systemic corticoids may be of help in persistent cases, anticholinergic and antiperistaltic agents may worsen the condition. Other causes of colitis should be considered.

Studies indicate a toxin(s) produced by *Clostridia* (especially *Clostridium difficile*) may be a principal cause of clindamycin and other antibiotic-associated colitis. These studies also indicate that this toxigenic *Clostridium* is usually sensitive *in vitro* to vancomycin. When 125 mg to 500 mg of vancomycin were administered orally four times a day for 5 - 10 or more days, there was a rapid observed disappearance of the toxin from fecal samples and a coincidental recovery from the diarrhea.

It should be noted that serious relapses have occurred up to one month after apparently successful treatment. A relatively prolonged period of continuing observation is therefore recommended.

PRECAUTIONS

Dalacin C (clindamycin hydrochloride) like any drug, should be prescribed with caution in atopic individuals.

The use of antibiotics occasionally results in overgrowth of non-susceptible organisms – particularly yeasts. Should super-infections occur, appropriate measures should be taken as dictated by the clinical situation.

As with all antibiotics, perform culture and sensitivity studies in conjunction with drug therapy.

Since abnormalities of liver function tests have been noted occasionally in animals and man, periodic liver function tests should be performed during prolonged therapy. Blood counts should also be monitored during extended therapy.

Dalacin C may be used in anuretic patients. Since the serum half-life of clindamycin in patients with impaired hepatic function is greater than that found in normal patients, the dose of Dalacin C should be appropriately decreased. Hemodialysis and peritoneal dialysis are not effective means of removing the compound from the blood. Periodic serum levels should be determined in patients with severe hepatic and renal insufficiency.

ADVERSE REACTIONS

Only 65 of the 851 patients treated for infections developed side effects representing 7.6% of the total study group or 8.0% of the 813 patients with follow-up. Only 22 of these patients' symptoms were considered due to Dalacin C (clindamycin hydrochloride) for an incidence of 2.7% among the 813 cases with follow-up.

Gastrointestinal: Abdominal pain occurred in 12 patients for an overall incidence of 1.4% in 851 patients and was considered drug related in 7 (0.8%).

Diarrhea occurred in 22 cases for an overall incidence of 2.6% and was drug related in 13 (1.5%). Vomiting occurred in 14 cases with an overall incidence of 1.6%. Seven patients (0.8%) had nausea which was drug related in 2 cases (0.2%). Side effects were severe in 10 instances. (See also under "WARNINGS"). Esophagitis, at times severe, has been reported.

Hemopoietic: Transient neutropenia (leukopenia) has been reported. Its relationship to therapy is unknown. No irreversible hematologic toxicity has been reported.

Skin and Mucous Membranes: Skin rashes have been reported in 6 patients (0.7%), none of which could be determined as drug related. One case of urticaria was reported but its relationship to drug therapy could not be determined.

Liver: Although no direct relationship of Dalacin C to liver dysfunction has been noted, transient abnormalities in liver function tests (elevations of alkaline phosphatase and serum transaminase) have been observed in a few instances.

SYMPTOMS AND TREATMENT OF OVERDOSAGE

No cases of overdosage have been reported. It would be expected however, that should overdosage occur, gastrointestinal side effects including abdominal pain, nausea, vomiting and diarrhea might be seen. During clinical trials one 3-year old child was given 100 mg/kg of Dalacin C (clindamycin hydrochloride) for five days and showed mild abdominal pain and diarrhea. One 13-year old patient was given 75 mg/kg for five days with no side effects. In both cases laboratory values remained normal.

Overdosage should be treated with simple gastric lavage. No specific antidote is known.

DOSEAGE AND ADMINISTRATION

Adults: 150 mg every 6 hours.

Moderately severe infections: 300 mg every 6 hours.

Severe infections: 450 mg every 6 hours.

Children (over one month of age) :

One of the following two dosage ranges should be selected depending on the severity of the infection:

1. 8-16 mg/kg/day (4-8 mg/lb/day) divided into 3 or 4 equal doses.
2. 16-20 mg/kg/day (8-10 mg/lb/day) divided into 3 or 4 equal doses.

Absorption of Dalacin C (clindamycin hydrochloride) is not appreciably modified by ingestion of food and may be taken with meals.

To avoid the possibility of esophageal irritation, Dalacin C capsules should be taken with a full glass of water.

For prevention of endocarditis: Adults: 300 mg orally 1 hour before procedure; then 150 mg 6 hours after initial dose. **Children:** 10 mg/kg (not to exceed adult dose) orally 1 hour before procedure; then 5 mg/kg 6 hours after initial dose.

Note: With β -hemolytic streptococcal infections, treatment should continue for at least 10 days to diminish the likelihood of subsequent rheumatic fever or glomerulonephritis.

AVAILABILITY OF DOSAGE FORMS

Each capsule contains clindamycin hydrochloride hydrate equivalent to 150 mg or 300 mg clindamycin base. Supplied in bottles of 100 and 500 capsules.

Further product information available on request. 17/08/95

References :

1. Sanford JP et al. The Sanford: Guide to Antimicrobial Therapy (26th ed.) 1996
2. Zambrano et al. Clindamycin in the Treatment of Human Infections 1992. 10 1-24
3. Penicillin Product Monograph: CPS, 32th edition, 1997, CPh A.



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Questions 36 through 40 are a repeat of the questions that appeared in the April issue of the *Journal* accompanied with correct answers, the rationales and specific references. Keep all copies of the *Journal* so you can correctly respond to the June 1998 quiz.

QUESTION 36

In the detection of fissure caries

1. fiberoptic transillumination (FOTI) is not reliable;
2. visual examination with a mirror and probe is the most accurate method;
3. a radiograph can confirm caries limited to the enamel;
4. sticking of the probe indicates the presence of caries.

- A. (1) (2) (3)
B. (2) (3) (4)
C. (2) and (3)
D. All of the above.
E. None of the above.

ANSWER : E

RATIONALE:

Caries must now be considered an infectious disease. In the early lesions, demineralization of the enamel occurs initially beneath the surface at which stage there is potential for remineralization. Probing may cause actual cavitation at this stage and lead to plaque accumulation and full development of a lesion. "Stickiness" of a fissure is an unreliable diagnostic criterion since it is possible to have clinically

- a true positive: caries present — probe sticks;
- a false positive: probe sticks — no caries;
- a true negative: no caries — no sticking;
- a false negative: no sticking — caries present.

Traditional probing with a sharp explorer has come into question.¹ The use of a sharp probe for the detection of minor lesions could be regarded as grounds for malpractice. Where fissure caries is suspected, fiberoptic trans-illumination (FOTI) is very effective in making the

diagnosis. When bitewing radiography is used, correct angulation, exposure and processing are critical. Fissure caries limited to enamel cannot be seen on a radiograph; positive radiographic identification occurs only when dentin is involved.

REFERENCES:

- 1) Caries diagnosis and risk assessment. A Review of Preventive Strategies and Management. *JADA Special Supplement* 126: June, 1995.
- 2) Nikiforuk, G., Ed. *The Oral Care Report* Vol. 6, No. 3, 1996.

QUESTION 37

Chlorzoin

1. releases chlorhexidine for 24 hours;
2. releases chlorhexidine for 8 hours;
3. inhibits colonization of *Streptococcus mutans*;
4. requires application of two substances.

- A. (1) and (3)
B. (1) and (4)
C. (2) and (4)
D. (2) (3) (4)

ANSWER: D

RATIONALE:

A relationship between dental caries and *Streptococcus mutans* has long been established. Over the past 25 years caries has been managed by controlling the growth and colonization of *S. mutans* on tooth surfaces. Chlorhexidine has proven to be an effective antimicrobial agent in this regard.

A recent review¹ provides excellent data on the use of chlorhexidine for caries management. Chlorhexidine varnishes have been shown to reduce effectively the numbers

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of oral *S. mutans* in the oral cavity for long periods of time. These varnishes, of which Chlorzoin is one, are usually applied once to the tooth surfaces and repeated only when *S. mutans* recolonize or remain at a high level as detected by saliva sample monitoring.

Chlorzoin is an antimicrobial agent which contains 10 per cent chlorhexidine acetate as the active ingredient. In application, the teeth are first cleaned with pumice or a non oil based prophylactic paste. After thorough drying, the liquid containing chlorhexidine is applied to all tooth surfaces. When it is dry, a coat of polyurethane in acetone is applied and air dried. For approximately eight hours thereafter, chlorhexidine is released and during that time colonization of the teeth by *S. mutans* is reduced. Although it is known that there is an effective reduction in the numbers of *S. mutans* for months after application, little knowledge exists regarding the effect of chlorhexidine varnish treatment on actual caries, although one study reports a reduction in root surface caries² and another³ reduction in fissure caries.

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QUESTION 38

Resin-modified glass ionomer cements (RMGIC)

1. are easy to place;
 2. are useful for Class III restorations;
 3. adhere only to enamel;
 4. adhere to dentin and enamel;
 5. can be used as alternatives to fissure sealants.
- A. (1) (2) (3)
B. (1) (3) (5)
C. (1) (2) (4) (5)
D. (1) (2) (3) (5)
E. All of the above.

ANSWER: C

RATIONALE:

The resin-modified glass ionomer cements (RMGIC) have properties which make them ideal in many clinical situations. Because of easy placement and improved esthetics they are preferred to the conventional glass-ionomer materials. However, they are not as esthetic as resin composites because of the inherent opacity of the set glass ionomer material. The RMGIC materials incorporate a light curing system to obtain initial set in addition to the

traditional acid base reaction between the acid soluble glass powder and polyalkenoic acid.³

Since they release fluoride, the RMGICs are an attractive option over composite resins for Class III and Class V restorations which are non-load bearing. They are also recommended as restorations in the primary dentition.

Besides being acceptable biologically, these modified resins have a biotherapeutic effect since with the initial set there is a burst of fluoride release which passes directly into the adjacent tooth structure causing conversion of hydroxy apatite into more insoluble hydroxyfluorapatite. This property and the ability to adhere both to dentin and enamel make them ideal bases for amalgam and composite resin restorations and also as luting cements for crowns where an acceptable film thickness is provided.

Because of the biotherapeutic property, these cements can also be used as alternatives to fissure sealants. A recent study⁴ compares both materials clinically. After one year, although retention of the RMGICs was less than sealants, there were fewer marginal discrepancies. Between both materials no difference either in caries development or marginal discolouration was detected.

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- 4) Winkler, M.M., Deschepper, E.J., Dean, J.A. et al. Using a resin-modified glass ionomer as an occlusal sealant: A one-year clinical study. *JADA* 127:1508-1514, 1996.

QUESTION 39

In a mandibular second premolar, you would suspect the presence of multiple canals in a diagnostic radiograph if

1. one large canal is seen in the apical one third;
 2. a radiolucent line is seen to the mesial of the main canal on a film taken at 20 degrees from the mesial;
 3. a radiolucent line is seen to the distal of the main canal on a film taken at 20 degrees from the distal;
 4. the mental foramen is superimposed on the root apex.
- A. (1) (2) (3)
B. (1) and (3)
C. (2) and (4)
D. All of the above.

ANSWER: A

RATIONALE:

Multiple canals in a mandibular second premolar can cause problems if not identified and clinicians should be alert to their possible presence. Two diagnostic radiographs should be taken to evaluate this tooth. If a film taken with the beam perpendicular to the tooth in a buccolingual direction shows one large canal in the apical 1/3

which disappears apically, multiple canals should be suspected. Then a second radiograph should be taken at 20 degrees from the mesial or distal of the tooth to reflect the buccolingual anatomy. If a radiolucent line is seen to the mesial or the distal of the main canal, suspect the presence of an additional canal and treat accordingly.

REFERENCES:

- 1) England, M.C., Hartwell, G.R. and Lance, J.R. Detection and treatment of multiple canals in mandibular premolars. *J Endod* 17:174-178, 1991.
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QUESTION 40

In restorative dentistry, the most common sites for the initiation of plaque induced inflammation of the gingivae are

1. within the embrasure;
2. the gingival col;
3. the interproximal sulcus.

- A. (1) and (2)
- B. (2) and (3)
- C. (1) and (3)
- D. All of the above.

ANSWER: D

RATIONALE:

The most common site for plaque induced inflammation is within the embrasures of the teeth. The gingival col and the interproximal sulcus apical to the contact areas are particularly prone to breakdown since these tissues lack keratinization. Design of interproximal surfaces of restorations should be flat and contiguous with tooth structures to avoid plaque retention.

REFERENCES:

- 1) Kois, J.C. The restorative-periodontal interface: biological parameters. *Periodontol* 2000 11:29-38, 1996.
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CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education points required for the maintenance of licensure.

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DENTAL BENEFITS ISSUES



Another Successful Year for CDAnet

James Gagnon

Now that the results for 1997 are known, CDA must congratulate its member dentists and their staff for participating in the exceptional success enjoyed by CDAnet during the past year.

With close to 7,000 dentists subscribing to CDAnet at the end of 1997 (the count was more than 7,000 at the end of the first quarter of 1998), Canadian dentistry and individual dental teams are making an important contribution toward the preservation of fee-for-service dental plans in Canada, as well as to controlling the administration costs of these plans.

The dentists on CDAnet are demonstrating their desire to be avant garde and lead the way. By doing so, they are also contributing to the improvement of a number of patient services that are not directly related to professional care. These dentists offer patients simplified access to their dental plan carrier. Equally important, by helping plan carriers to control their administration costs, they allow these organizations to exercise more latitude in their contractual decision making.

CDAnet, now more than six years old, has made huge strides since its inception. Today, however, the network is getting ready to enter a new, unprecedented phase of its development with the launch of the Réseau ACDQ/CDAnet system in Quebec. The new system should lead to promising negotiations with, some government agencies, the renewal of agreements with CDAnet's



current partners (discussions are under way), the addition of new plan carriers to the CDAnet family, and the introduction of the Dentaide Network.

Over the weeks to come, computer equipment suppliers will be invited to undergo certification tests for Version 4.0 of CDAnet. Once the certification process is complete, they will be able to activate Version 4.0 in your office. Clearly, there will be a period of transition to allow all CDAnet partners to initiate this conversion effectively and smoothly.

The technological advances offered by Version 4.0 will make CDAnet even more effective, and allow the network to reach unprecedented heights. Your participation, as well as your dental team's participation, will be essential. Every dentist should ensure that all claims that can be processed through CDAnet, for each and every patient covered by a participating CDAnet dental plan, are submitted electronically. In addition, please remember that patients must receive an *Explanation of Benefits* or an *Acknowledgment of Receipt* form for their claim at each visit.

Before wrapping up, I would like to provide you with a few statistics to illustrate what we have accomplished together in 1997:

- more than 5.3 million claims were processed by CDAnet, a 33 per cent increase from 1996;
- more than 6,900 Canadian dentists are participating in CDAnet, a 25 per cent increase in just one year;
- more than 1,000 calls and e-mail messages are received each month at CDAnet's administrative centre, which is located at CDA;
- one new insurer joined CDAnet in 1997; and
- three additional computer equipment suppliers now offer Version 3.0 of the CDAnet software in British Columbia.

These are statistics that we can all be proud of.

Finally, I would like to invite you and your administrative staff to attend and participate in a seminar on CDAnet on May 8, 1998. The seminar will be held at 2 p.m. in the Caledon Room of the Crowne Plaza Hotel in Toronto, as part of the conjoint ODA/CDA National Convention. Meet the CDAnet staff, network representatives and insurers, and find out how you can use CDAnet to be even more efficient in your daily administration.

Many thanks to all. Let's keep working together to better meet the needs of patients.

Mr. James Gagnon is CDA's director of practice management support services.

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+ : Dosages suggested are for adults, with clinically severe (often life-threatening) infections. Dosages also assume normal renal function, and not severe hepatic dysfunction.
++ : Alternative therapy includes these considerations: allergy, pharmacology/pharmacodynamics, compliance, local resistance profiles.
+++ : AM/CL = amoxicillin/clavulanate

Adapted from Sanford 1996

*Penicillin, which was the antibiotic of choice for a long time, induces the production of β-lactamase by certain anaerobes, specifically *Bacteroides* species, and clinical failures have been increasingly reported in the literature.²

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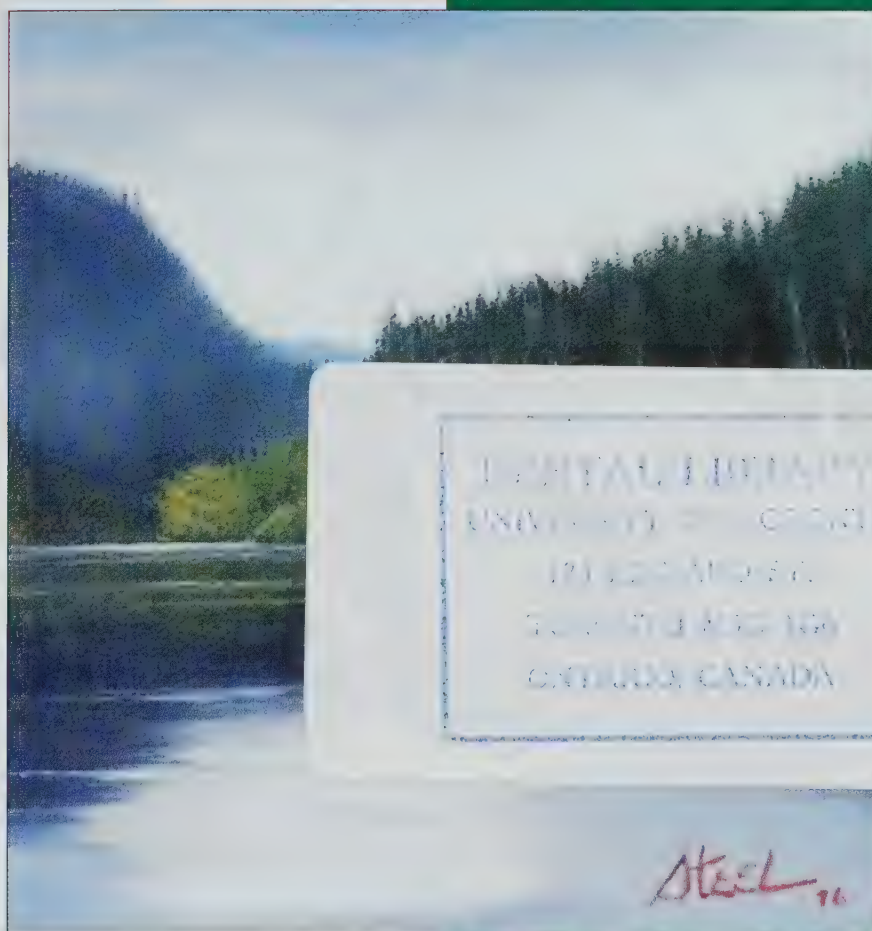


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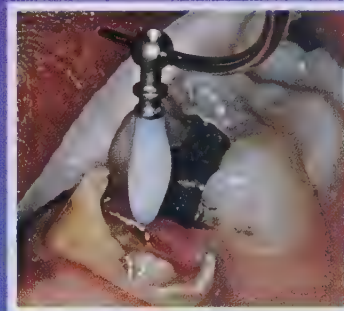
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"Solitude",
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by Dr. J. Steel.



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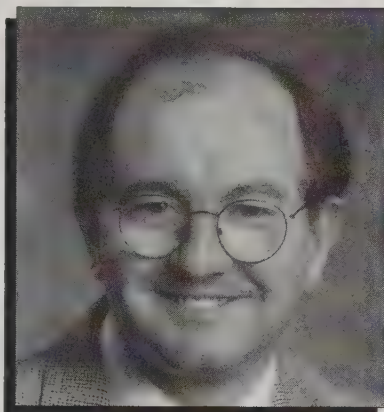
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EDITORIAL

SCIENCE, OPTIONS AND INFORMED CONSENT



Dr. John P. O'Keefe

One day per week for the past few months, I have been practising wet-fingered dentistry in an Ottawa general dental practice. My primary objectives for doing so are to keep up with developments in dental practice, and to understand the everyday concerns of my professional colleagues.

The practice of dentistry has changed considerably since I entered the profession in 1980. To my mind, the most significant evolution has taken place in the area of dentist-patient communication. Because patient autonomy is much more important today, dentists are providing patients with science-based treatment options and allowing them to decide which option suits them best.

I graduated from dental school thinking that the medical model of education had prepared me to be a skilled professional, and provided me with a specific body of knowledge that I would use to improve the oral health of the trusting patients who would attend my practice. The emphasis in our ethics classes, if my memory serves me well, was on non-maleficence (first, do no harm!), beneficence and fairness. Less emphasis was placed on patient au-

tonomy, the fourth pillar of biomedical ethics, in those distant days.

I entered practice confident that I had a valuable skill set, and I expected patients to trust my judgment and appreciate what I would do for them. However, there was a period after graduation when older and more experienced practitioners seemed to say to me: "Forget what you learned in dental school, we will show you how things are done in the real world." I don't know if any of you experienced a similar transition from school to practice, but my first few years were spent gaining confidence, learning new techniques and picking up speed.

I now know the term to describe how I acted in my relations with patients in those years: "paternalism." I would examine a patient, make a diagnosis, and pronounce that a certain course of treatment was needed. Without exception, I fully expected the patient's response to be something like: "You're the expert Doc., go right ahead, and spare me all the gory details of your explanations."

In those early days, I was quite shocked if someone questioned a treatment plan that I had proposed. Looking back on it now, I suppose I felt let down that the sceptical patient didn't trust my judgment as much as I felt it ought to be trusted.

Toward the latter part of the 1980s, however, I started to hear that patients were more willing to sue dentists, as the "bond of trust" between the providers and recipients of dental care seemed to disappear. The statistics from dental regulatory bodies, on both sides of the Atlantic were consistent: poor communication was at the root of approximately 60 per cent of the disciplinary problems faced by dentists.

I interpret "poor communication" to mean that patient expectations from dental treatment were not being met in certain cases. Patient expectations may have been too high to begin with, or they may have been raised unduly by the treating dentist during the pre-

sentation of the treatment plan. Regardless, the surprised patient becomes an unhappy patient, and the unhappy patient is more likely to seek compensation.

Funnily enough, I believe that most patients are quite tolerant of genuine mistakes made by practitioners, especially if they are alerted immediately to the mistake and palliative steps are instituted with compassion.

We are told that this is an era of consumer power in Canada. People in this country have access to an amazing amount of information about health matters, although not all of this information is of high quality. At the same time, more and more Canadians seem to be obsessed with health care. Our politicians tell us that it is the number one political issue in the country at present.

Drawing a parallel from our attitude to infection control, we should perhaps make the assumption that each patient who presents in our office is a highly educated and informed consumer of dental care, who wants to be an active partner in clinical decision making. For this consumer of dental care to give informed consent to treatment, he or she must be presented with the pros and cons of various treatment options. The most valid and defensible justification for presenting these options is that they are based on the best available scientific knowledge. However, the state of scientific knowledge can change with time and new research.

I believe that we must also communicate to patients that no treatment option is perfect, and that choices between treatments rest on trade-offs. I also believe that it is vitally important to take the value system of the patient into account when a decision is made to follow a particular course of treatment. What do you think?

John P. O'Keefe, Editor
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150 mg, 300 mg

The recent edition of the Sanford Guide to Antimicrobial Therapy 1996 recommends
®Dalacin® C Capsule as

First line antibiotic for empirical therapy of Odontogenic Infections^{1†}



**Available
on Formularies•**

Empirical Antimicrobial Therapy on Clinical Grounds¹

([†]Optimal antimicrobial therapy is based upon accurate indications and susceptible testing of casual agents; these are only "INITIAL" guidelines)

Anatomic site/Diagnosis/ Modifying circumstances	Etiologies (usual)	Suggested Regimens*		Therapeutic Measures and Comments
		Primary*	Alternative**	
Odontogenic Infection	Oral microflora	Clindamycin 300 mg q6h po	Erythromycin 500 mg q6h po or AM/CL*** 500/125 mg bid po	[†] Surgical drainage and removal of necrotic tissue essential. β-lactamase resistant organisms are increased in frequency.**

+ : Dosages suggested are for adults, with clinically severe (often life-threatening) infections. Dosages also assume normal renal function, and not severe hepatic dysfunction.
++ : Alternative therapy includes these considerations: allergy, pharmacology/pharmacodynamics, compliance, local resistance profiles.
+++ : AM/CL = amoxicillin/clavulanate

Adapted from Sanford 1996

*Penicillin, which was the antibiotic of choice for a long time, induces the production of β-lactamase by certain anaerobes, specifically *Bacteroides* species, and clinical failures have been increasingly reported in the literature.²

**In Canada, most *Bacteroides* species are resistant to Penicillin.³

®Dalacin® C capsule is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *Bacteroides* species, *Peptostreptococcus*, anaerobic *Streptococci*, *Clostridium* species and *microaerophilic Streptococci*. Also indicated in serious infections due to sensitive gram-positive organisms (*Staphylococci*, including penicillinase-producing *Staphylococci*, *Streptococci*, and *Pneumococci*) when the patient is intolerant of, or the organism is resistant to other appropriate antibiotics. ®Dalacin® C capsule is indicated for prophylaxis against α-hemolytic (*viridan group*) *Streptococci* before dental, oral and upper respiratory tract surgery.

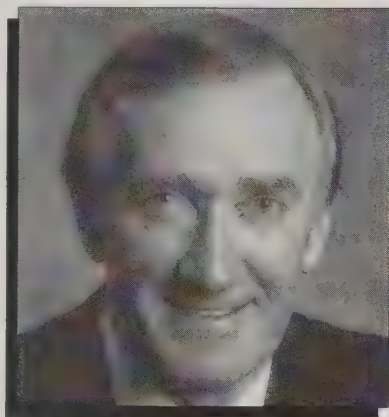
Most commonly reported side effects are diarrhea (2.6%) and vomiting (1.6%). For warnings, please refer to the prescribing information.

•150 mg capsule: available on all provincial formularies. 300 mg capsules: available on the following provincial formularies -- Ontario, Quebec, British Columbia, Alberta, Saskatchewan, Manitoba, Nova Scotia, Newfoundland.



PRESIDENT'S COLUMN

CDSPI: RUN BY DENTISTS, FOR DENTISTS



Dr. Toby Gushue

With all the recent controversy surrounding the long-term disability (LTD) plans offered by Canadian Dental Service Plans Inc. (CDSPI), one cannot help but question why the Canadian dental profession is in the business of providing group plans for its members at all.

The reason is actually very simple. We can obtain better coverage for our members in a group plan than they could obtain individually, both for dentists who are easily insurable and for those who are not.

Although an easily insurable dentist may be able to buy a better or less expensive plan in the market place than he or she could obtain through the Canadian Dentists' Insurance Program at a specific point in time, buying from CDSPI will invariably be advantageous over the long term.

However, it is important for dentists to understand that CDSPI is not an insurance company. In fact, it is an administration company owned by CDA and nine of Canada's 10 provincial dental associations. You and I, as members of these associations, are the true owners of CDSPI.

In addition, although CDSPI negotiates with insurance companies to obtain the best possible

plans for our members, the insurance companies are still the risk bearers and the payers of claims.

When CDSPI states that its plans are designed for dentists by dentists, it is referring to the fact that four of the five directors on its board are dentists. This board uses expert consultants from the insurance industry to design and improve the plans available through the Canadian Dentists' Insurance Program, and presents recommendations on new plans and plan changes to CDA's executive council (consisting of nine dentists) for approval.

As the administrator of these plans, CDSPI contracts with the dentist on behalf of the insurer, prepares the invoices, and collects the premiums. It also acts as a link between the dentist and the insurer, responds to questions, and helps members initiate claims.

From personal experience, I know the kind of service CDSPI provides to a member seeking to file a claim. Within days of notifying CDSPI that I wanted to submit a claim, they mailed a claim kit to me. Thirty days later, they telephoned to ask if I needed assistance in filing my claim. They contacted me a second time by phone to offer their assistance after 60 days, and by registered letter after 75 days. Since I was proceeding slowly with filing my claim, I actually felt that I was being over serviced by CDSPI.

The advantages of participating in the plans offered by CDSPI are clear. First and foremost, the plans are owned by CDA rather than by the insurance company. So if the experience of a plan is good, the insurance company does not profit over and above its normal earnings. Instead, surpluses can be refunded to insured participants, as was the case a couple of years ago, or they can be used to reduce or stabilize premiums.

CDSPI also offers dentists a free, "no obligation" comparison service. Through this service, an independent consultant will compare the plans offered in the marketplace against the plans avail-

able through the Canadian Dentists' Insurance Program to determine which plan best meets an individual dentist's needs. Another major advantage of CDSPI is the Return to Work Assistance Program, which is built into the LTD plan. It provides disabled participants with up to \$100,000 for the retraining or specialized equipment they need to become productive again. In addition, the LTD plan provides built-in coverage against financial losses resulting from HIV or HBV infection.

The strength of numbers has helped CDA to forge a powerful and highly successful partnership with its member dentists and its corporate members. Dentistry also benefits from the strength of numbers in the insurance and investment realm, thanks to CDSPI.

Just a few years ago, a major insurer was able to offer attractive LTD premiums to many dentists. Today that insurer is no longer selling LTD insurance. CDSPI, on the other hand, is not only still offering LTD coverage, it is also still offering "Own Occupation," a coverage option that is becoming more difficult to find outside of the Canadian Dentists' Insurance Program.

LTD coverage is similar to fire or collision insurance. It exists to protect us against the financial consequences of a catastrophic incident that affects our ability to continue working. However, a number of insurers have found that some dentists, including participants in CDSPI plans, are trying to tap their LTD coverage as a source of retirement income. Unfortunately for these individuals, a certifiable disability and loss of income must exist before benefits can be paid.

Remember, group plans are designed with the group in mind, and in any group there are wide variances. However, CDSPI plans protect all participants, and offer unique benefits that make participation in these plans very worthwhile for the vast majority of dentists.

*Toby Gushue, BA (Ed.), BA, DDS
President of the Canadian
Dental Association*

Journal

June
1998
Vol. 64
No. 6

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LETTERS



Dentistry After the Fee Guide

I read David Schwab's April 1998 *CDA Journal* article with much interest, but am greatly concerned by many of the statements he makes (Schwab, D. Dentistry After the Fee Guide. [It's My Opinion] *J Can Dent Assoc* 64:321-322, 1998).

In Manitoba, we have always printed a fee guide, based on the premise that it is only a guide, and will only be utilized if an individual practitioner feels the fees it contains are applicable to their particular circumstances. The actual fees charged can be higher or lower than those listed in the guide, provided they are consistent for all patients.

The guide is also printed with our commitment to the public in mind. Since we are responsible for providing and supervising nearly all of the dental care Manitobans receive, we have endeavored to establish fees that allow affordable access to preventive care and are fair. Careful and extensive surveys of both the profession and the public allow us to establish criteria to ensure cost recovery for dentists and a comfort level for patients, based on a high acceptance of our prevention programs, along with a willingness to proceed with more extensive care when necessary.

Association suggested fee guides coalesce the profession's collective opinion of what services are worth, both in the absolute and relative to each other. Different associations establish the internal relativity of fees in somewhat different ways. Although the results may be imperfect, they are generally fairly reasonable and ac-

ceptable to dentists. When there is a strong consensus that some fees are out of line, they are revised. In the absence of some form of fee guide, a rational internal relativity of fees would be highly unlikely. It is much more likely that, as the last fee guide faded into memory, an arbitrary alignment of fees would result that would differ from dentist to dentist and from place to place.

Dr. Schwab ignores the presence and importance of insurance companies in the dental services marketplace. Insurance companies want uniformity of pricing, and to pay the lowest price possible. Clearly, they would react to the abandonment of an association fee guide by implementing schedules of their own. There is every reason to believe that these fee schedules will initially be lower than previous association guides, and will increase more slowly over time. Rational internal relativities would disappear, as the insurance companies' knowledge in this area would be scant.

Even though some insurance companies pay less than current provincial fee guides now, they are undoubtedly affected by the presence of fee guides and the amounts of annual increases.

With or without an association fee guide, a dentist is free to charge less than the prevailing average if he or she chooses to do so. Alternately, a dentist may try to differentiate his or her practice, and thereby raise his or her prices above the average, or even charge a premium for premium services, as Dr. Schwab suggests. The existence of an association fee guide does not prevent this.

If a dentist charges above the association fee guide, patients may demand an explanation. In a world where association fee guides did not exist, the patient might be prone to challenge a dentist who charges more than his or her colleagues. The result would likely be more discomfort for the dentist than would occur if an association fee guide was in

place. Challenges in relation to insurance fee schedules would also be harder to fend off if there were no association guide.

In the 1990s, government programs have aimed to arbitrarily decide what fees to pay dentists and other health professionals, and to grossly undercut prevailing rates. The abandonment of association fee guides will only assist government in this regard, by eliminating the standards suggested by the profession.

I find Dr. Schwab's statement that the Alberta fee guide created a situation where "the best dentists earned no more for a good procedure than their less-skilled counterparts" particularly alarming. Who among us is in a position to decide that our fees should be higher because someone else is less skilled?

The notion that setting one's fee near the averages "signals to the public that the practice itself is average" is ridiculous. It would be true only if the best dentists always charged more, the mediocre dentists always charged average prices, and the poor dentists always charged the least.

Dr. Schwab goes on to state that "because the vast majority of dentists adhered strictly to the fee guide, they inadvertently ceded control of their practice profitability to third parties," and that "...it (the fee guide) effectively put a cap on their earning power."

"In this deregulated environment," he says, "there is also no theoretical upper limit on a dentist's income."

These statements show some misconceptions about dental economics. Earnings and income are determined by many factors in addition to price, including volume (which is itself dependent on many other variables such as time management, quality of service, ability to attract and retain patients, etc.); efficiency in managing overhead costs; entrepreneurial ability; and the mix of services provided. In addition, dentists have never been compelled to



move in lock step with inappropriate fees in an association guide.

If dentists follow the fees in their association fee guide quite closely, it means that the guide reflects what the profession thinks the services are worth. Associations do not attempt to identify members who charge less than the guide, and they do not pressure or discipline them into raising their fees. Indeed, most dentists are very good at maintaining their individuality.

Dr. Schwab also contends that "There was a gentlemen's understanding...that a dentist avoided discussing fees with patients."

Whether there has ever been such an understanding is debatable, but associations in the 1990s certainly encouraged their members to be completely forthcoming about fees. It is in a dentist's best interest to explain charges fully in advance, and to avoid misunderstandings with patients.

Dr. Schwab states that "Although price is only one element in the marketing mix (the others are product, place, promotion and people), it does allow dentists to differentiate themselves from the competition."

In my view, one differentiates his or her product to justify charging a higher price; one does not differentiate his or her product by charging a higher price, except in the unusual case of "snob" purchases. Snob purchases represent a reversal of normal supply and demand, where the consumer buys something not because it is better, but because it is priced higher.

The Picasso analogy also seems inappropriate. Picasso's art was unique and recognized on a world wide basis. Dentist's services are not unique, and most consumers are not likely to identify differences in the technical quality of a dentist's output.

I realize the article is only Dr. Schwab's opinion, and as such he is certainly entitled to it. I would hope, however, that this opinion is not shared extensively by CDA's management committee, executive council and board of governors.

Barry Rayer, DMD
Chair, Economics Committee
Manitoba Dental Association
Winnipeg, Man.

It is with much sorrow that I read the article "Dentistry After the Fee Guide" by David Schwab, which appeared in the April 1998 *CDA Journal* (Schwab, D. Dentistry After the Fee Guide. [It's My Opinion] *J Can Dent Assoc* 64:321-322, 1998).

I strongly disagree with Dr. Schwab's assertion that "dentists who are working at full capacity should certainly raise fees". Working full capacity may indicate using equipment and facilities to their fullest, thus decreasing overhead. Reducing overhead may allow fee reductions for the more costly treatments, which are unfortunately not affordable to many Canadians. Should the "clubby world of brandy snifters, fine cigars, and overstuffed chairs" of the 19th century give way to selfishness and greed in the 21st century, where one can set fees as high as the market will allow? Stating that "there is no longer a ceiling beyond which fees cannot rise" or "that there is no theoretical upper limit on a dentist's income" or that "there are opportunities...to treat fewer patients...and raise fees" certainly does not seem to focus on CDA's mission i.e. "...the promotion and provision of optimal oral health for Canadians."

Daniel Azuelos DDS
Unity, Sask.

In the April 1998 issue of the *Journal*, David Schwab presents an interesting right-wing philosophy to dentists, and outlines the opportunities to maximize practice incomes in the forthcoming post fee guide era (Schwab, D. Dentistry After the Fee Guide. [It's My Opinion] *J Can Dent Assoc* 64:321-322, 1998).

The author is not new to the fee guide debate. In the wake of the Alberta Dental Association's decision to abolish its suggested fee schedule in favor of a questionnaire-based survey, which will result in the annual publication of the average fees charged across the province for all treatment procedures, he recently presented a marketing seminar to the Edmonton and District Dental Society.

Essentially, the author seems to believe that a free market will exist in the absence of a fee guide, one in which dentists will be free to set their own fee structures based on the quality of their work (as self-determined by each dentist), their years of experience, and their office overhead. The frank subtext in his opinion piece clearly encourages clinicians to exploit the lack of an official fee guide to increase fees at will.

Among the many valid arguments that support the restraining influence of past fee guides, all of which were omitted from Dr. Schwab's article, there exists the distinctly civilized function called "accountability." Health professionals are expected to be accountable to the greater society, not only for the quality of their work but also for setting a fair value on the treatment they render. For a given procedure, adequately performed, the public will be justifiably confused when the fee for that procedure varies from office to office, regardless of the varying, self-proclaimed reputations of the dentists involved.

Unlike Dr. Schwab, I find something sickeningly egomaniacal about telling a patient "I'm expensive because I'm damned good."

In this era, where intense scrutiny is being applied to the escalating costs of health care, our profession has a greater responsibility than ever to act in a restrained manner to stabilize oral health care costs. Consumer groups, etc., have already placed the high cost of dental care under the analytical microscope. One would hope that there are few dentists who wish dentistry to stand out, conspicuously, as a major contributor to the skyrocketing costs of health care.

Responsibility for matters such as these distinguishes effective health professionals from mere business entrepreneurs. Although a good business sense is a *sine qua non* in contemporary practice, our first priority must be the healing aspect of dentistry. I read no significant reference to the delicate balance between profit and healing in the author's work.



Dr. Schwab's ahistoric description of the evolution of fee guides omitted the true reason for their existence. They were never imposed on the profession against its collective will, but were formulated by dentists as a joint endeavor to remove oral health care from the common marketplace, and to standardize fees so that dentists could build their reputations based on their actual skills rather than on public relations hoop-la. Generally, such guides were tentative only, allowing for higher or lower charges, depending on the degree of difficulty and responsibility associated with the procedure. They were not as restrictive as Dr. Schwab implies. However, such cost restraints were partly responsible for allowing dentistry to evolve from the Painless Parker era of itinerant "tooth drawers" into a responsible health profession.

In Alberta, specifically, the elimination of the fee guide needs to be viewed in the true political context in which it occurred. The Alberta government had decreed that fee guides are monopolistic and restrict free enterprise. The Alberta Dental Association dutifully obeyed this dictum, by abolishing its fee guide. It is to be replaced by the published results of an annual fee survey, which, whether intended or not, will still provide Alberta practitioners with a fee guide. However, as the response to official dental questionnaires in Alberta can involve as few as 30 per cent of the dentists polled, there is no guarantee that the published averages will be accurate. Ironically, the provincial government still believes that this administrative manoeuvre will drive the costs of dentistry down.

Nowhere in his article does the author mention such salient factors as the patients' ability to afford treatment, the presence and significance of insurance plans (and the eternal "co-payment" enigma), the dentist/population ratio, and the many unnecessarily luxurious dental suites that some colleagues opt for — all of which impact significantly on the profitability of contemporary dentistry.

According to Dr. Schwab's criteria for success, a very mediocre practitioner, using an incremental fee formula based on years of experience, would eventually charge fees that could exceed those of specialists — unless the specialists, having attended Dr. Schwab's lectures, would have escalated their fees on a similar basis.

Since the early days of dentistry, our profession has been bombarded with a blitz of managerial snake-oil remedies, all guaranteed to make us millionaires provided we join the ranks of the true believers. Most of these "prophets of greed" (greed being a word that is rapidly disappearing from the U.S. business lexicon) came from south of the 49th parallel. The fact that there may be a fertile market for these snake-oil salesmen in Canada is worrisome, as it strongly suggests that our profession may not be attracting the best types of candidates for entry into our dental schools.

The truly avoidable, but nonetheless ethical, business attitudes that we are compelled to employ for our very survival in practice are enough of a threat to our professional ideals on their own, without further augmentation by the philosophies of avarice being disseminated by unregulated marketing gurus. A friendly, civil attitude, good dentistry, a constant awareness of ethical standards, and a fair fee structure are what will build a solid practice. These are the eternal constants in dentistry. Embrace these conditions, "and they will come."

Donald F. Mulcahy, DDS
Edmonton, Alb.

Guidelines On the Use Of Space Maintainers — Author's Reply

I thank Dr. Russell G. Stephens for his "Letter To the Editor" published in the April 1998 issue of the *Journal* (Stephens, R.G. Guidelines On the Use Of Space Maintainers. [Letters To the Editor] *J Can Dent Assoc* 64:308-309, 1998).

As a known critic of the evidence-based health-care approach, Dr. Stephens' comments will prove helpful as our profes-

sion starts to accept the new evidence-based health-care paradigm. Similar criticisms occurred in the medical profession when the evidence-based paradigm displaced such established procedures as routine tonsillectomies and caesarian sections.

Dr. Stephens raises three issues that I will address. The first issue is Dr. Stephens' concern regarding disclosure of my analytical method for developing the space maintainer article.¹ As stated in the methods section, the article was written to the exact standards developed by the Canadian Task Force on the Periodic Health Examination. A reference to the appropriate Canadian task force article was provided so that interested readers could access and evaluate the analytical methodology used in the space maintainer article.² This leading edge methodology requires a thorough evaluation of all aspects of each article included in the review, thus precluding the use of abstracts alone. This way of reporting the analytical methodology is consistent with that used by most of the 81 preventive health-care measures addressed within the Canadian Guide to Clinical Preventive Health Care.³

The second issue is Dr. Stephens' comment that "Whether guidelines such as this (i.e., C recommendations) should be published at all is an issue among those involved in guideline development, since such indeterminate statements provide little meaningful aid to practitioners." This statement reflects a lack of familiarity with either the development or use of clinical practice guidelines. A quick perusal of the Canadian Guide to Clinical Preventive Health Care reveals that many clinical procedures are given a "C recommendation." These recommendations can be very useful to clinicians faced with difficult clinical decisions. Clinicians need and have a right to know which procedures have been proven to either work or not work, and which procedures have not been proven one way or the other. I feel the November 1997 space maintainer article¹ gives



good examples for how a "C recommendation" can be useful for clinical decision making. Therefore, no additional examples will be offered.

Finally, Dr. Stephens addresses one very important issue in the development of clinical practice guidelines. I agree fully that validation by an expert panel and independent external reviewers is an important part of guideline development. Prior to the review process, a potential guideline is best considered to be an "evidence-based report." However, unlike the medical profession, the dental profession lacks the infrastructure necessary for authors to submit reports for expert review. The closest we can currently come (short of sponsored guidelines such as those currently under development by the Royal College of Dental Surgeons of Ontario) is to submit articles to a peer reviewed journal such as the *Journal of the Canadian Dental Association*. No referees that reviewed the space maintainer article reported any concern with the interpretation of cited articles, or with the comprehensiveness of articles included. Theoretically, I agree that since the space maintainer article did not undergo the expert panel and external review process, it is best considered to be an evidence-based report and not a clinical practice guideline. However, until the Canadian dental profession develops the necessary infrastructure to evaluate such evidence-based reports, they are a giant advance over those dogmatically following the opinion of experts.

Doug Brothwell, B.Ed., DMD
Toronto (Ontario)

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1. Brothwell, D.J. Guidelines On the Use Of Space Maintainers Following Premature Loss Of Primary Teeth. *J Can Dent Assoc* 63:753-766, 1997.
2. Goldbloom, R. and Battista, R.N. The Periodic Health Examination. 1. Introduction. *Can Med Assoc J* 134:721-723, 1986.
3. The Canadian Task Force on the Periodic Health Examination. The Canadian Guide to Clinical Preventive Health Care. ISBN 0-660-15732-2. Health Canada 1994.

Guidelines For Antibiotic Prophylaxis

In his February 1998 editorial, Dr. John O'Keefe stated: "Knowledge is power. The dentist is in a position of power in the individual dentist/patient relationship" (O'Keefe, J. "Health Direction Or Beauty Business: What Direction Is Dentistry Taking? [Editorial] *J Can Dent Assoc* 64:75, 1998).

Despite this, CDA recently approved new instructions concerning the administration of antibiotics such as penicillin to patients who need it. I am one of those patients.

Recently, in the process of having a tooth extracted, I was given at once the quantity of medication that I previously would have taken over a period of days. I had a reaction, and now am deprived of a precious mean of fighting infection. I am very angry about this.

Reading Dr. O'Keefe's editorial, I assume that he is a responsible person, and as such, will take steps to reverse the instructions regarding the administration of antibiotics "in bulk," thereby protecting the dentists' clients.

I recently heard of a person who failed to recognize the fact that she had suffered a reaction, and on the next occasion became very ill and nearly died. This is a very serious matter, and I hope that the Canadian Dental Association will reconsider what I consider an unwise decision.

Ms. Templeton
Victoria, BC

Editor's Response

I spoke with Ms. Templeton recently on the phone. She was very distraught, and no amount of science based reasoning would convince her that the current guidelines for prophylaxis against bacterial endocarditis have merit. I bring her subsequent letter to your attention for two reasons: to present a patient's perspective on one of our therapeutic interventions, and to highlight the fact that our Journal is read by members of the Canadian public. Dentist-patient communication is one of the vital issues facing the profession today.

Giving Time To Your Profession Can Make a Difference

In the March edition of the *Journal*, Dr. Burton Conrod's article, "Giving Time To Your Profession Can Make a Difference," refers to initiatives being undertaken in British Columbia on behalf of the professions, such as the discussion paper on private health services plans and an information package on managed care for new graduates (Conrod, B. Giving Time To Your Profession Can Make a Difference. [Dental Benefits Issues] *J Can Dent Assoc* 64:179,181, 1998.)

While reference was made to the College of Dental Surgeons of B.C., there was no mention of the B.C. Federation of Dental Societies. As the organization responsible for government negotiations, insurer relations, practice management and economics, which includes the annual production of the B.C. Fee Guide, we have initiated many projects from developing a booklet on managed care that was sent to all B.C. dentists and will be provided to new dentists registering in B.C., to the discussion paper on private health services plans which was sent out earlier this year.

As the member services organization for dentists in B.C., the federation is committed to meeting the needs of our dentists. As Dr. Conrod has aptly pointed out, our work is only possible due to the dedication and time of the more than 40 dentists who volunteer with the federation. These volunteers and the work they have done for us prove that giving time to the profession is making a difference. Hopefully, our presence at the last CDA board meeting will let the dentists across Canada know about the existence and good work done by the B.C. Federation of Dental Societies.

William Dunnigan, DDS
President, B.C. Federation
of Dental Societies
Vancouver, B.C.

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Journal Advertising

Dr. O'Keefe responded to a reader in the last *Journal* who was concerned about the accuracy of some claims made by advertisers. (Editor's Response. [Letters to the Editor] *J Can Dent Assoc* 64:163, 1998). He also asked readers for "their opinions on this fundamental issue."

I suggest that when advertisers make statements as though they were proven facts, they must show that these claims are documented in reputable publications. For example, Trident in the March issue of the *Journal*, claimed that the Xylitol in Trident gum has been clinically proven to prevent cavities by up to 62 per cent. This claim was referenced to a study by

D. Kandelman et al published in the *Journal of Dental Research*. On the other hand, the Listerine ad published on the back cover of the March issue claimed a 36 per cent reduction in gingivitis, compared to a 30.5 per cent reduction with Chlorhexidine. Where is the documentation to back up this claim? Our *Journal* should only accept advertisements if the claims made by the advertiser are appropriately backed up.

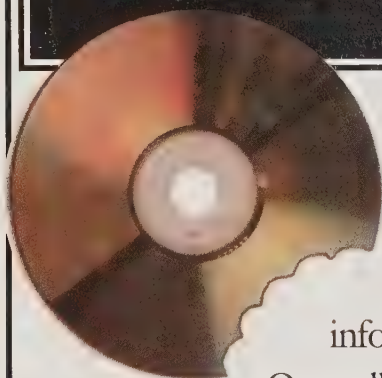
I have been a member of the CDA since 1962 and a reader of the *Journal* for over 35 years. I am dismayed at the preponderance of advertising that has invaded the *Journal*. In the March *Journal*, 40 pages were devoted to scientific reports and items of general interest, and 32 pages were filled

with advertisements. This is unacceptable for a scientific *Journal*.

If this situation wasn't bad enough, the March issue of the *Journal* was packaged with an assortment of paraphernalia, which consisted of 10 booklets on cheese by the Canadian Dairy Producers as well as pamphlets, booklets and leaflets from eight other advertisers. Is this necessary to support the cost of producing the *Journal*? I suggest that CDA reconsider accepting any and all sources of advertising. You could start by refusing advertisers who make questionable claims that they do not back up with scientific communication.

R.E. Patton, DDS, Cert, Pediatr.
Vancouver, B.C.

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Journal

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NEWS UPDATE



"Solitude", an oil painting by Dr. J. Steel.

Cover Artist: Dr. John Steel

A self-taught landscape painter, Dr. John Steel also enjoys racing pigeons and playing old-timers hockey.

Dr. Steel is a 1969 dental graduate of the University of Alberta. He subsequently served in

the Canadian Forces at the rank of major, in both Canada and Cyprus. Following several years of private practice in Regina, Sask., he relocated to Moose Jaw, Sask., where he has practised for the past seven years.

Dr. Steel is a past-president of the Moose Jaw and District Dental Society. ■

Appointments

Endodontist Elected ODA President

An endodontist from Willowdale, Ont., has been elected president of the Ontario Dental Association.

Dr. Wayne Pulver, who practices in Toronto, Ont., obtained his dental degree from the University of Toronto in 1973, and was a resident at Beth Israel Hospital in Boston, Mass.

From 1974 to 1976, Dr. Pulver was a clinical fellow in endodontics at the Harvard School of Dental Medicine and Forsyth Dental Centre. Since 1978, he has been

head of endodontics at Mt. Sinai Hospital in Toronto, and an associate professor in the University of Toronto's dental faculty.

Dr. Pulver is a past-president of the Ontario Society of Endodontists, the Toronto Academy of Dentistry, and the Canadian Academy of Endodontists. ■

AAE Elects Canadian Treasurer

The American Association of Endodontists has elected a Canadian dentist as treasurer.

Dr. Marshall Peikoff was elected to the post in May.

In addition to maintaining a full-time private practice in

Winnipeg, Man., Dr. Peikoff has been an associate professor in endodontics at the University of Manitoba since 1969.

Dr. Peikoff obtained his DMD from the University of Manitoba in 1963, before earning his M.Sc.D. in endodontics from Boston University in 1969. He is a past-president of the Canadian Academy of Endodontics and the Manitoba Dental Association, and is a fellow of the Royal College of Dentists. ■

CADR Elects Toronto Dentist As President

The Canadian Association of Dental Research (CADR) has



Dr. Hardy Limeback is congratulated on his election as president of Canadian Association of Dental Research by outgoing president Dr. Ed Yen.

elected a Toronto, Ont., dentist as president.

Dr. Hardy Limeback, who currently serves on CDA's council on education as well as the consumer products recognition committee, was elected to the post this spring. He is an associate professor and the head of preventive dentistry at the University of Toronto, and a former Medical Research Council (MRC) scholar.

Prior to 1994, Dr. Limeback practised part-time as an associate, and was chief of dental services for the Toronto Metropolitan Homes For the Aged. Since then, he has maintained a private dental practice in Mississauga, Ont.

Dr. Limeback's research interests include tooth development, fluoride and bone. He is currently investigating fluoride, dental fluorosis and human bone quality under an MRC operating grant. ■

ASGD Elects Canadian Dentist To Executive Committee

The American Society For Geriatric Dentistry (ASGD) has elected a North York, Ont., dentist to its executive committee.

Dr. Aldo Boccia was elected to the committee in March.

ASGD is the only dental professional association dedicated to the oral health needs of oral adults. ■

ADPD Elects Canadian Dentist As President-Elect

The Academy Of Dentistry For Persons With Disabilities (ADPD) has elected a Toronto, Ont., dentist as its president-elect.

Dr. Michael J. Sigal was elected to the post in March.

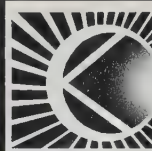
ADPD is one of the only professional associations dedicated to issues and concerns for people with disabilities. ■

INFORMATION PACKAGE

CDA Resource Centre Package for June 1998

This package contains a selection of reading materials on DENTAL FOCAL INFECTIONS. It is available to CDA members for \$5.00 plus applicable tax.

A complete list of information packages is available upon request by calling 1-800-267-6354 or can be easily accessed on the CDA web site at www.cda-adc.ca. Once inside our site, please log into the "CDA Members" area and click on "Resource Centre" and a list of packages can be viewed.



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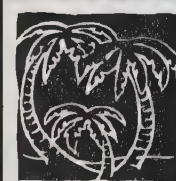


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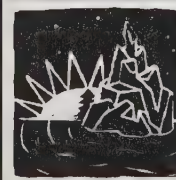


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CLINICAL



Central Mucoepidermoid Carcinoma

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 Louis G. Mercuri, DDS, MS

ABSTRACT

A case of central mucoepidermoid carcinoma of the mandible is presented along with a review of the literature. The histogenesis of this tumor and the histologic similarity of the predominantly cystic low-grade central mucoepidermoid carcinoma to the glandular odontogenic cyst are discussed.

Key Words: Salivary gland, neoplasm, carcinoma, mucoepidermoid, jaw

Introduction

Mucoepidermoid carcinoma was first described by Stewart, Foote and Becker¹ in 1945, under the term mucoepidermoid tumor. Since then, controversy has existed regarding the possible existence of a benign variety of the tumor.

In 1991, the World Health Organization (WHO) changed the terminology for the lesion from "mucoepidermoid tumor" to "mucoepidermoid carcinoma," recognizing that these tumors may infiltrate locally and metastasize.²

Mucoepidermoid carcinoma is now the most common malignant tumor of the salivary glands. It represents from five per cent to 15 per cent of all salivary gland tumors according to reports from various centres in North America,

but its frequency in the United Kingdom is considerably lower.³⁻⁸

Conversely, central (intraosseous) mucoepidermoid carcinomas of the jaws are quite uncommon. Approximately 80 cases have been published in the literature to date.^{5,9} However, Waldron and Koh¹⁰ and Waldron, El-Mofty and Gnepp¹¹ have noted that primary intraosseous mucoepidermoid carcinomas may not be as rare as generally believed. They made this statement after identifying six cases of the condition in the 426 minor salivary gland tumors they obtained from 11 different institutions, and discovering four additional cases in their files since the report by Browand and Wal-

dron¹² (none of these cases have been reported in the literature).

The histogenesis of central mucoepidermoid carcinoma is still uncertain. However, it has been suggested that the neoplasm develops from the epithelial lining of an odontogenic cyst.¹³⁻¹⁵

This report presents a case of central mucoepidermoid carcinoma of the mandible, which appears to have been caused by a neoplastic alteration of the odontogenic epithelium. Its purpose is to:

1. Present the clinical; radiographic and histologic features; treatment; and prognosis of central mucoepidermoid carcinomas.
2. Discuss the histogenesis of central mucoepidermoid carcinomas.



Fig. 1: Preoperative panoramic radiograph revealing a multilocular radiolucent lesion in the right retromolar area and ramus of the mandible (arrows).

3. Relate the criteria used to determine whether a mucoepidermoid carcinoma has arisen intraosseously.

4. Review the literature.

5. Discuss the inclusion of the glandular odontogenic cyst in the differential diagnosis of central mucoepidermoid carcinomas.

Case Report

A 61-year-old Mexican woman presented complaining of a tumor in her jaw. One month before, she had gone to a dentist near her Texas home for a routine dental examination. He noted an asymptomatic swelling in the right retromolar pad area, and referred the patient to an oral and maxillofacial surgeon. The surgeon took a panoramic radiograph (**Fig. 1**), which revealed a multilocular lesion associated with the right mandibular angle/body area. A biopsy of the lesion revealed a mucoepidermoid carcinoma. When the patient was informed of the diagnosis, she contacted her son who lives in Chicago. He recommended that she come to Chicago for treatment.

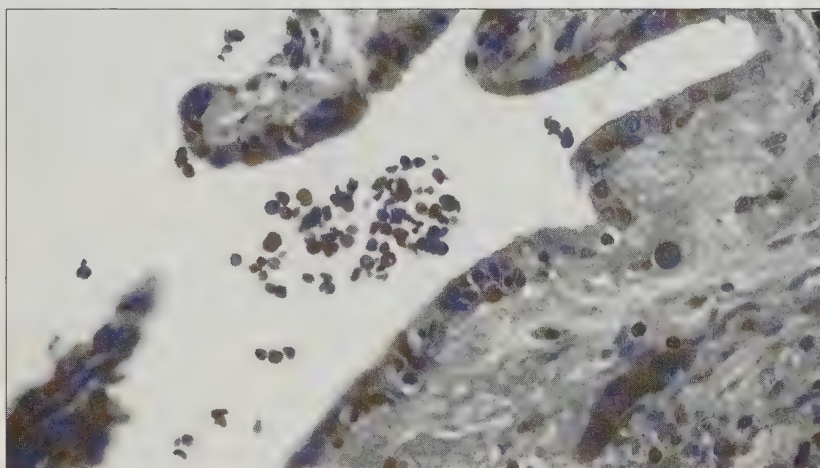
The patient was evaluated by the head and neck surgery service and the oral and maxillofacial surgery service of Loyola University Medical Centre. Her lesion was biopsied and a diagnosis of mucoepidermoid carcinoma was established. A mandibular CT scan (**Fig. 2**) was then done to delineate the extent of the lesion in all three planes. This showed that the tumor was confined to the bony mandible with no soft tissue extension.

The case was presented to the head and neck tumor board, and it was agreed that the oral and maxillofacial surgery service would treat the lesion by wide local excision, enucleation, curettage and the fulguration of the associated mandibular bone (**Figs. 3a and 3b**). The patient's past medical history was unremarkable and non-contributory.

Surgery was performed as planned, without complication. The resulting specimen consisted of multiple fragments of soft tissue and bone. A few of the soft tissue fragments showed a smooth glistening



Fig. 2: Preoperative CT scan showing buccal and lingual expansion of the mandible in the region of the lesion (arrows).



Figs. 3a and 3b: Odontogenic cyst wall and lining showing flat cuboidal (Fig. 3a) epithelium admixed with goblet cells (Fig. 3b) (H & E, 40x and 100x).

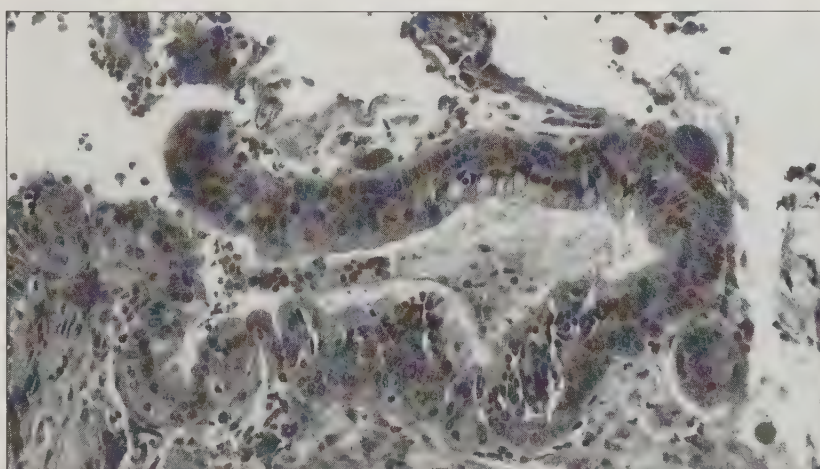


Fig. 3b

surface suggestive of a cyst wall. The cystic area, submitted as a separate specimen, contained proteinaceous and mucoid material. Non-keratinizing squamous cells, alternating with areas of flat cuboidal and goblet cells, made up the cystic epithelial lining (**Figs. 3a, 3b and 4a**).

In addition, an invasive tumor composed of polygonal and cuboidal cells was seen extending through the cyst wall into the adjacent bone and marrow spaces. The tumor showed areas of squamous differentiation in direct proximity to mucin-producing cells (**Figs. 4a and 4b**). Clear cells, admixed with the epidermoid cells, were also present.

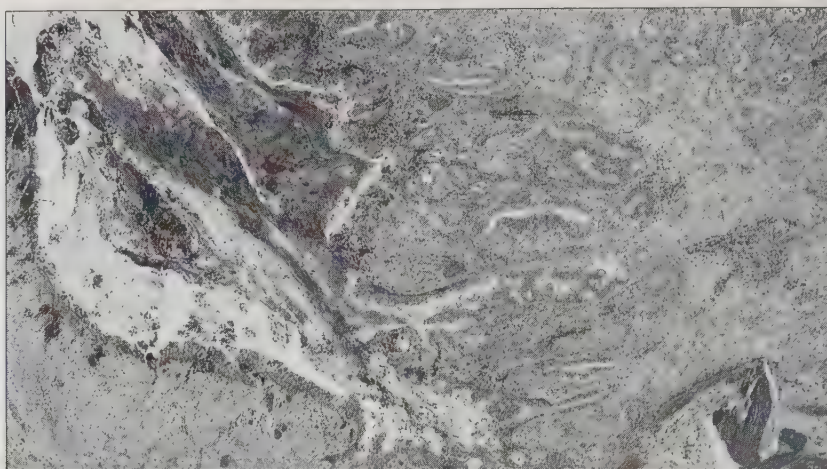
The tumor appeared as a direct extension of a cystic lining epithelium (**Fig. 5**). Multiple areas of the cystic lining had histologic features similar to those of the invasive tumor, including increased epithelial thickness admixed with the presence of goblet cells.

Positive intracytoplasmic and glandular luminal staining were frequently observed with mucicarmine stain. This staining corresponded to PAS positive, diastase-resistant regions (**Fig. 6**). In addition, some of the clear cells contained glycogen. No soft tissue component of the tumor was observed in the specimens obtained from the adjacent non-osseous tissue. The tumor was completely eradicated by conservative local excision.

The patient was discharged on the third post-operative day. Five months later she returned to Texas with no evidence of disease. The patient has been followed for one year with no evidence of recurrence.

Discussion

From the reports in the literature, it appears that intraosseous mucoepidermoid carcinomas occur about three times more commonly in the mandible than in the maxilla.¹⁰ The molar region of the jaw, both maxillary and mandibular, seems to be the site of predilection.^{3,5,10} As many patients are asymptomatic, the lesion is generally discovered during routine roentgenographic examination. Some patients note a painless swelling or facial asymmetry,



Figs. 4a and 4b: Mucoepidermoid carcinoma extending through the cyst wall to the adjacent bone (**Fig. 4a**). The tumor is characterized by epidermoid cells admixed with mucin producing goblet cells (**Fig. 4b**) (H & E, 40x and 200x.)

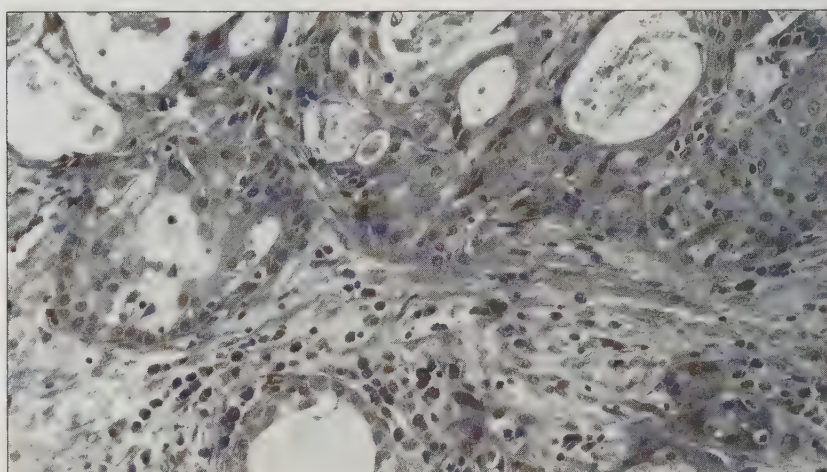


Fig. 4b

however. Pain was present in about half of the cases reported by Gingell et al¹³, but dysphagia and paresthesia are rarely reported.

The female to male ratio for intraosseous mucoepidermoid carcinomas is approximately 2:1. Although the overwhelming majority of cases occur in the fourth and fifth decades,⁵ central mucoepidermoid carcinomas are seen in children on occasion. Ezsias et al⁵ recently reported the sixth case ever described in a child under the age of 16.

With intraosseous mucoepidermoid carcinomas, radiograph findings are varied and not diagnostic. The lesions are radiolucent. Approximately half of them can be described as unilocular radiolucencies, and half as multilocular radiolucencies.¹⁰ The margins of these lesions are usually well defined. A radiographic differen-

tial diagnosis usually includes odontogenic cysts and tumors, as it did in this case. Eversole et al¹⁵ found that almost 50 per cent of central mucoepidermoid carcinomas are associated with impacted teeth or an odontogenic cyst.

Most authors suggest that before a mucoepidermoid carcinoma can be identified as an intraosseous lesion, certain criteria must be met. These include:

- a) radiographic evidence of bone destruction;
- b) histologic confirmation;
- c) positive mucin staining of the tumor cells;
- d) the absence of a primary lesion elsewhere;
- e) exclusion of an odontogenic tumor; and
- f) the presence of intact cortical plates.

Waldron and Koh¹⁰ have questioned the need for intact cortical plates to be present before a tumor can be diagnosed as an intraosseous mucoepidermoid carcinoma. They noted that the absence of an obvious soft tissue tumefaction may be all that is necessary to indicate that a tumor has developed in an intraosseous location. Intact cortical plates were noted in the case presented in this report, however, indicating the patient's tumor was a central one.

The histogenesis of these neoplasms has attracted considerable attention in the literature. A number of sources of epithelium are thought to give rise to the central mucoepidermoid carcinoma, including:

1. Developmentally entrapped minor salivary gland tissue derived from inclusions of the embryonic rests, or from salivary glands displaced from the lining of the maxillary sinus.
2. Neoplastic transformation of the epithelial lining of odontogenic cysts.

In the reported case, there was evidence suggesting the presence of an odontogenic cyst, in which a neoplastic transformation of the lining epithelium into a mucoepidermoid carcinoma appeared to have occurred. Odontogenic cysts commonly display mucus-producing cells in their lining epithelium.^{16,17} Knowing the pluripotent capacity of odontogenic epithelium, it is not surprising that neoplastic transformation can occur.³

Mucoepidermoid carcinomas are usually classified into three grades: low, intermediate, and high. Low-grade tumors have a better prognosis. Fortunately, most central mucoepidermoid carcinomas are of this histologic grade. In a review of the literature on central mucoepidermoid carcinomas, Waldron and Koh¹⁰ noted a significant incidence of local recurrence. According to their estimates, the incidence of local recurrence approaches 25 per cent. They also determined that only six deaths related to intraosseous mucoepidermoid carcinomas have been reported, five of which were related to uncontrolled local re-

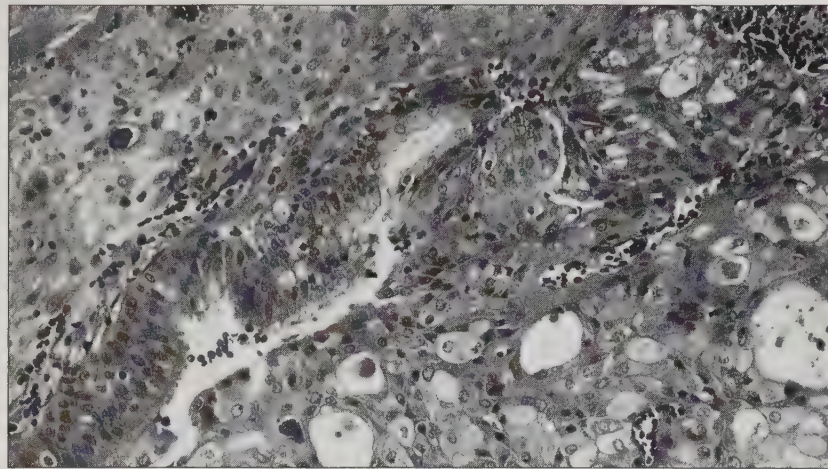


Fig. 5: Tumor arising from the cystic epithelial lining (H & E, 200x).

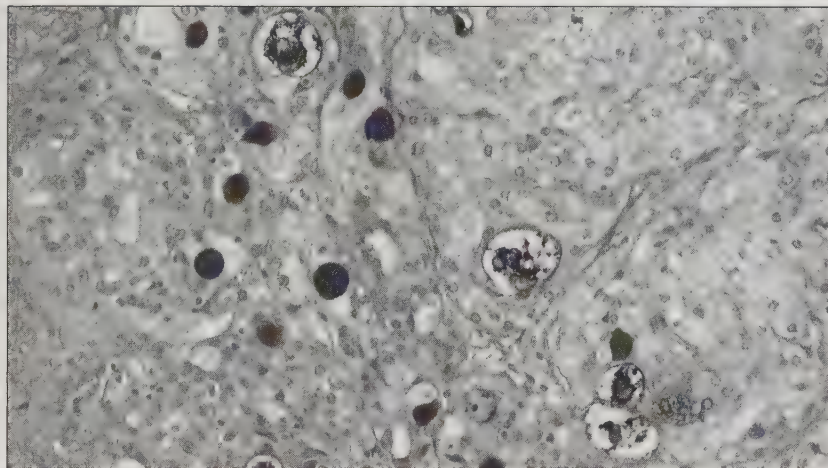


Fig. 6: Tumor showing intracytoplasmic and intraglandular luminal positive staining with mucicarmine (Mucicarmine, 200x).

currence.¹⁰ In the sixth case, death was likely caused by the carcinoma invading the base of the brain.¹⁰ There are few cases with long-term follow-up (many are less than one year). As a result, it is almost impossible to characterize the clinical behavior of this tumor.

Most authors believe that radical surgery with en bloc resection is the best course of treatment for intraosseous mucoepidermoid carcinomas, in view of the high incidence of recurrence and occasional metastases.^{3,5,9,10,13,15,18-20} More radical surgery, possibly including neck dissection, may be indicated with high-grade lesions.^{3,9}

Waldron and Koh¹⁰ noted that a lesion variously known as glandular odontogenic cyst, sialodontogenic cyst, and mucoepidermoid cyst should be considered in the differential diagnosis of central mucoepidermoid carcinoma. There is some overlap histologically between

glandular odontogenic cysts and predominantly cystic low-grade central mucoepidermoid carcinomas.¹⁰ They believe the distinction is largely related to the degree of epithelial proliferation. The glandular odontogenic cyst has an epithelial lining that is uniformly thin, without evidence of the more solid or microcystic epithelial proliferations that are seen in the mucoepidermoid carcinomas.¹⁰ They also note that some cases previously diagnosed as central mucoepidermoid carcinomas may be reclassified as examples of glandular odontogenic cysts, now that this lesion has received recognition.¹⁰ These two entities should continue to be separated. We agree with Gardner et al²¹ that the term glandular odontogenic cyst is most appropriate, because of the confusion between the words cyst and carcinoma when the term mucoepidermoid odontogenic cyst is used.



As noted by Eversole et al,¹⁵ ordinary odontogenic cysts may transform into odontogenic neoplasms, epidermoid carcinomas or, as in this case, mucoepidermoid carcinomas on occasion. The importance of this uncommon neoplasm should not be minimized as, if it is not properly treated, recurrences are common.⁹ Radical resection appears to offer the best chance of tumor eradication, while long-term follow-up is advised.⁹ ■

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INFECTION CONTROL



The Continuing Epidemic Of HIV and AIDS In 1998

J.B. Epstein, DMD, MSD

S. Silverman Jr., MA, DDS

M. Gorsky, DMD

Dental providers must be aware of the AIDS epidemic's progress, the changed prognosis of infected patients due to improvements in the medical management of the condition, and the changes that have occurred in the oral manifestations of HIV and AIDS.

Despite encouraging reports on the effects of combination drug therapies involving anti-retroviral nucleosides and protease inhibitors, no effective drugs that will eliminate the human immunodeficiency virus (HIV) *in vivo*, nor vaccines that will prevent the transmission of the virus, have been developed.

In addition, while the recent optimism regarding the combined use of antiviral drugs has been supported by reductions in serum viral load, improvement in helper cell (CD4) counts, an increased quality of life, and improved survivals,^{1,2} many patients are unable to continue treatment because of toxicities associated with combination therapies. There is also evidence that the virus will escape the combined effects of the antivirals over time, leading to a recurrence in the signs and symptoms of AIDS.

Epidemiologically, there has been a stabilization of new cases of AIDS in the developed countries of the West, but the HIV in-

fection rate appears to be out of control in under-developed countries, due to a lack of both funds and effective education programs.

Three years ago, we compared Canadian and American populations in an attempt to predict the future course of AIDS.³ At that time, we identified a shift in the high-risk groups for HIV infection. Although HIV was still overwhelmingly predominant in men who have sex with men (MSM), an increase in the incidence of infection in heterosexual individuals was observed. The heterosexual group included intravenous drug users, women, and children (mainly by perinatal transmission).

Our 1995 predictions were based on the similarities of HIV infection in the Canadian and American populations, and the larger experience in time, numbers and trends in the United States. The purpose of this update is to analyse the current occurrence of HIV infection, and compare demographic findings for the Canadian and American populations to assess current directions or trends, as well as the progress that has been made in controlling the AIDS epidemic.

Since the AIDS epidemic began in Canada, more than 15,000 AIDS cases have been reported.⁴ In the United States, the number of reported AIDS cases has now sur-

passed 160,000, which represents the largest number of reported cases in any country with national surveillance.⁵ As Canada's population is approximately 10 per cent of the U.S. population in size, the smaller number of reported cases in Canada may reflect the difference in population between the two countries.

A comparison of the 1995 and 1996 trends in Canada⁴ and the U.S. reveals similar patterns of HIV infection in both countries (Table I).^{5,6} There is a continuing relative increase in HIV infection in women, and an increasing percentage of injection drug users with HIV (Table II). In the most recent quarterly surveillance report on HIV infection (to June 30, 1997), the proportion of diagnosed cases involving women was 13.2 per cent. This represents the highest proportion ever observed for this population. The ratio of infected females to infected males was 1:15 prior to 1993. It is now 1:7.

Although the largest AIDS group still consists of MSM, there was a relative decrease in the proportion of HIV-infected individuals belonging to this population between 1995 and 1996 (72.2 per cent and 67.4 per cent, respectively). However, there was an increase in the number of reported heterosexuals with AIDS.

Table I

Number Of AIDS Cases By Sex, Canada (CA) and British Columbia (BC) — All Ages (Percentage).				
	1995		1996	
	CA	BC	CA	BC
Males	1,270 (91.2)	229 (93.1)	649 (90.5)	118 (92.9)
Females	122 (8.8)	17 (6.9)	68 (9.5)	9 (7.1)
Total	1,392 (100)	246 (100)	717 (100)	127 (100)

Number Of AIDS Cases By Sex, U.S. (US) and San Francisco (SF) — All Ages (Percentage).				
	1995		1996	
	US	SF	US	SF
Males	59,671 (80.9)	1,558 (94.5)	54,997 (79.5)	1,024 (93.3)
Females	14,096 (19.1)	91 (5.5)	14,154 (20.5)	74 (6.7)
Total	73,767 (100)	1,649 (100)	69,151 (100)	1,098 (100)

The incidence of blood- and perinatal-related HIV cases has decreased dramatically. This was not unexpected, given the stringent guidelines that have been imposed on blood donations and blood banks, as well as the precautions and special procedures that have been established for the treatment of pregnant HIV-infected women. However, as these numbers represent the cumulative experience, the relative decrease in the percentage of HIV cases involving MSM in recent years is greater than the decrease in the percentage of cases involving blood and perinatal transmission, indicating a substantial change in risk groups.

In the United States, AIDS is developing more quickly in the heterosexual population than in any other population group (**Table III**). This is probably due to the persistence of injectable addictive drug use, widespread prostitution, unprotected sex, and the large number of sexually transmitted diseases. There has also been progressive carelessness in sexual behavior, which may stem from an attitude of false security created by the new drug combinations and optimistic reports, as well as from the apathy that hearing similar precaution messages year after year seems to produce.

AIDS data from the United States as a whole and from San Francisco, California⁷ (a city with an extremely high AIDS rate), can probably be used to predict the current and future patterns of HIV infection for similar populations, including those of both Canada and British Columbia.

Although the death rate from AIDS has dropped in recent years, this phenomenon may be short-lived. Death rates will likely start to climb again as HIV develops resistance to the current anti-retroviral drugs, and attempts to initiate behavior modification regarding "safe" sex, better described as "safer" sex, fail.

A review of the preliminary 1997 data for both Canada and the United States reveals a continuation of the profiles noted in 1995 and 1996. Greater effort and more programs are clearly necessary if improved control of the AIDS epidemic is to be effected in the near future.

In the United States, ethnicity and socioeconomic status play a significant role in HIV infection. Sixty per cent of reported AIDS cases involve African Americans and Latinos, even though these groups represent only 22 per cent of the general population. This appears to be related to the minimal

success of current education programs on prevention and treatment.

HIV surveillance data recently became available for Canada, which may further delineate the future course of the infection. However, HIV serology results are only available anonymously, and only at the request of a licensed health care worker. This approach therefore does not represent epidemiologic screening, but does include those individuals who donate blood, and those who a health care worker deems to require the test. These data are based on the results of HIV serological tests performed throughout the country (**Tables IV and V**).

A total of 33,520 HIV seropositive tests were reported between November 1985 and December 1994 (**Table IV**), although in some instances these may represent repeat tests of the same patients. Similarly, a total of 3,093 cases of HIV seropositivity were identified in Canada in 1995 (**Table IV**), which is comparable with the mean number of cases reported over the prior 10 year period.

These data indicate that a substantial future demand on health care services should be anticipated. There have been no trends identified suggesting a shift in risk due to age (most Canadian cases are

Table II
Number Of AIDS Cases By Exposure Canada (CA) and British Columbia (BC) — All ages.

	1995				1996			
	Adult Cases							
	CA		BC		CA		BC	
	M	F	M	F	M	F	M	F
MSM	920	—	189	—	446	—	90	—
IDU	76	31	18	9	57	17	12	5
MSM/IDU	68	—	10	—	34	—	10	—
Heterosexual	112	68	13	10	75	41	7	4
Blood/factors	25	6	1	—	15	4	3	—
Other	57	6	7	—	18	5	1	—
Subtotal	1258	111	240	19	645	67	124	9

	Pediatric Cases (M+F)			
Blood/factors	2	—	0	—
Perinatal	19	2	3	1
Other	2	—	2	—
Subtotal	23	—	5	—
Total	1392	2	717	1

Other = occupational exposure or no identified risk

Table III
Number Of AIDS Cases By Exposure US and SF — All Ages.

	1995			1996		
	US		SF	US		SF
	M	F	M and F	M	F	M and F
MSM	31,283	—	1,240	27,316	—	797
MSM/IDU	3,783	—	157	2,967	—	98
IDU	14,313	5,411	185	12,333	4,694	151
Heterosexual	2,004	3,121	31	2,375	3,202	21
Heterosexual/risk	1,031	2,575	4 [†]	924	2,320	0 [†]
Blood/factors	352	287	8	281	270	3
Other	6,519	2,288	24	8,457	3,334	28
Total	59,285	13,682	1,649	54,653	13,820	1,098

Heterosexual = Sex with HIV infected or risk not specified.

Other = Hemophilia/coagulation disorders or not reported or identified.

† = Lesbian or bisexual IDU.

diagnosed in individuals between 25 and 44 years of age, which is similar to the situation in the U.S.). Serological test results suggest that a continuing HIV shift will be seen in heterosexuals, women and injectable drug abusers. Although the infection risk from blood products has decreased, perinatal transmis-

sion may have increased. HIV seropositive rates appear to have stabilized in the MSM/lesbian and injectable drug user risk groups, but may have increased in heterosexual groups. Antiviral drug programs for pregnant women and newborns have reduced perinatal transmissions.

Of importance to the dental provider, the frequency, severity, and perhaps the nature of the oral manifestations associated with AIDS have changed. Pre-existing oral conditions such as candidiasis and Kaposi's sarcoma may dramatically improve when a combination of anti-retroviral medications

Table IV

HIV Positive Test Reports In Canada November 1985 – December 1994					
	M (Per Cent)	F (Per Cent)	Unknown (Per Cent)	Total Number of Cases	Per Cent of Total Cases
British Columbia	87.1	8.7	4.2	8,131	24.3
Alberta	91.4	8.6	—	2,402	7.2
Prairies/Territories	75.2	10	14.8	791	2.4
Ontario	87.3	7.8	4.9	15,256	45.5
Quebec	76.1	14.8	9.1	6,172	18.4
Atlantic Provinces	84.6	12.1	3.3	768	2.3
Total	85.1	9.5	5.4	33,520	100

HIV Positive Test Reports In Canada January 1995 – December 1995					
	M (Per Cent)	F (Per Cent)	Unknown (Per Cent)	Total Number of Cases	Per Cent of Total Cases
British Columbia	76.7	22.7	0.6	688	22.2
Alberta	75.8	24.2	—	182	5.9
Prairies/Territories	82.1	17.9	—	78	2.5
Ontario	80.1	15.7	4.2	1,384	44.7
Quebec	75.5	20.7	3.9	701	22.7
Atlantic Provinces	83.3	13.3	3.4	60	1.9
Total	78.1	18.9	2.9	3,093	100

Table V

Major Risk Categories For HIV In Canada (Per Cent)

	1985 – 1994		1995	
	Male	Female	Male	Female
Total	90	10	80.5	19.5
MSM	38.1	—	27.3	—
Heterosexual	2	1.4	5.3	3.8
Drug abuse	3.4	1	9.8	3.9
Blood/product	1.8	0.5	0.9	0.5
Perinatal	0.2	0.2	0.5	1
Other	1.5	0.5	1.2	1.4
Total number of cases	31,719		3,002	

(Cases where the gender was unknown were excluded from the calculations.)

is initiated. This reflects the effects of anti-retroviral therapy on viral replication and the host immune response. The subsequent increase in time of survival may lead to changes in the frequency and nature of the oral conditions that have previously been reported in AIDS cases. This may lead to an increased incidence of malignant diseases, as well as dramatic occurrences of opportunistic infec-

tions and immunologic conditions. It should be remembered that the recurrence of oral findings related to HIV infection and AIDS may be a marker indicating a relapse of HIV disease, and progressive immunosuppression. ■

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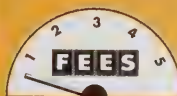
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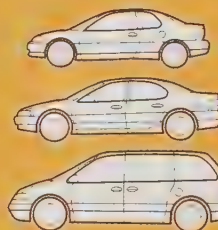
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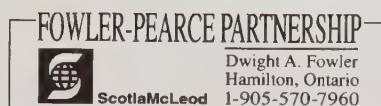
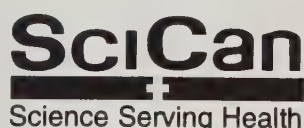
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Since last September, the SLSA Program has been published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by a quiz of 15 questions. Included with this issue, you will find the Quiz for the 1997-1998 SLSA Program, together with a response card.

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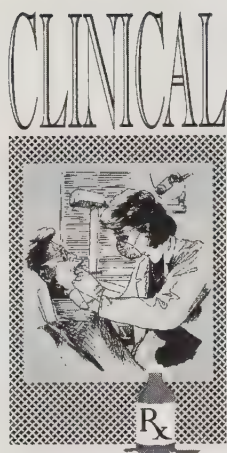
Answers to the Quiz will be published in the September 1998 issue of the *Journal*. Quiz results will not be provided by either CDA or SLSA.

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A Review Of Common Dental Treatments During Pregnancy: Implications For Patients and Dental Personnel

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ABSTRACT

In general, pregnant females tend to over estimate the risk of teratogenicity in the foetus resulting from medical and dental procedures and/or drugs. This may cause them to avoid necessary treatment, leading to detrimental health effects for both the foetus and themselves. In this review, the concerns of pregnant dental patients and personnel will be discussed, including the perceived risks associated with amalgam restorations, radiation, local anesthetics, nitrous oxide gas, antibiotics and analgesics administered in a dental setting. Pregnant dental personnel have special concerns related to their daily occupational exposure to mercury and nitrous oxide. After assessing the potential risks of undergoing dental treatment during pregnancy, it can be stated that necessary treatment should not be withheld. In addition, dental treatments are best performed in the second trimester for the benefit of the foetus, and optimal comfort for the pregnant woman.

Introduction

In treating pregnant patients, dentists must consider both drug dose and time of gestation before prescribing medications. Pregnancy may cause alterations in the patient's drug handling characteristics, including changes in drug absorption, increased

glomerular filtration rate, decreased gut motility, and increased body water volume.¹ For antibiotic and analgesic therapy, older drugs are generally preferred because of the available information regarding their use during pregnancy.

The possible detrimental effects on the foetus due to dental treatment include congenital malformations, neonatal withdrawal, direct toxicity, and long-term neurodevelopmental effects. To assess the potential for various drugs and treatments to result in teratogenetic effects, dentists should consider the baseline risk of anomalies. Approximately three per cent of newborns will exhibit major congenital malformations following average gestations.²

Amalgam Restorations

Amalgam is a metallic alloy comprised of mercury (50 per cent) combined with other metals. Dental professionals have used amalgam as a restorative material for over a century due to its durability and cost effectiveness. However, it is now recognized that amalgam restorations release vaporized mercury during chewing, grinding, drinking hot liquids and teeth brushing.³⁻⁵ Approximately 80 per cent of this liberated mercury is absorbed into the bloodstream via the lungs or digestive tract.^{3,6} Accumulation in both the foetus and the

pregnant woman is largely in the kidney, with smaller amounts being accumulated in the brain, gastrointestinal tract and liver.³

Mercury is known to cause congenital malformations.^{6,7} Methyl mercury, the predominant organic form of the metal, is the most toxic mercury compound known to cause teratogenic effects, and is responsible for a large proportion of the documented cases. Several examples of severe poisoning in humans, leading to Minamata disease, were documented in the early 1950s in Japan.

The methyl mercury contamination of a river close to Japan's Minamata Bay was responsible for causing neurological symptoms in infants, children and adults living in the area. Infants exposed before birth exhibited symptoms of foetal Minamata disease by four months of age. None of the diseased infants were breastfed or given contaminated food, suggesting that the effects of methyl mercury resulted from *in utero* exposure.⁷

Mercury is released from amalgam restorations as inorganic mercuric vapor and elemental mercury, which have been linked to congenital malformations in animal studies. However, most of the animal experiments that resulted in congenital malformations involved exposure to compounds



such as methyl mercury at levels at least 20 times higher than those likely to be encountered in normal human situations.⁴

Pregnant Patients

Recent data has confirmed that the amount of mercury absorbed from amalgam restorations (2.0-5.0 µg per day) is minimal, not clinically significant to the dental patient,^{4,5,8} and well below the toxic level (approximately 10 per cent of the normal daily mercury exposure from other environmental sources). It is not high enough to produce a teratogenic effect.^{4,5,9}

Several studies have attempted to correlate the number of amalgam restorations in the mouth with the mercury concentration found in human organs. Drasch et al found a correlation between the number of maternal amalgam restorations and the concentration of mercury in foetal organs, particularly in the liver and kidney, but could not find a similar correlation in newborns or older children.⁹

Halbach et al criticized the findings of Drasch et al, stating that they did not adequately justify the study's conclusion. In particular, only offsprings from mothers with two or fewer and 10 or more restorations were included in Drasch et al's statistical analysis. Their conclusions may therefore be misleading, as a substantial number of subjects were excluded.¹⁰

In 1995, a report entitled *Assessment of Mercury Exposure and Risks from Dental Amalgam* was prepared for Health Canada to determine a tolerable daily intake (TDI) level for the mercury associated with amalgam restorations. Although an arbitrary value was determined, the study was criticized by both Canadian and U.S. experts due to its authors making several assumptions, and their selection of a vague number as a safety factor.¹¹

A Health Canada stakeholder committee subsequently reviewed this report, and published a document entitled *The Safety of Dental Amalgam*. The document included a position statement that was based on an investigation of past research, as well as consultations

with dental professionals. Health Canada ultimately concluded that amalgam has been safely used for many years with no evidence of ill effects in the general population.¹¹ The U.S. Public Health Service concurs with Health Canada, and advises dentists to continue using amalgam in the average patient.¹¹ However, the Health Canada report states that amalgam restorations should not be removed from or placed into a pregnant patient. This statement, which is supported by other researchers, reflects the need for more research and is not directly related to the potential effects of amalgam on the foetus.¹⁰⁻¹²

Pregnant Dental Personnel

Concerns about occupational exposure were raised because the mercury hygiene procedures used in the 1970s and early 1980s were often inadequate.⁵ At that time, the atmospheric mercury levels in over 10 per cent of dental clinics in the U.S. were above the suggested workplace standards.⁵ The American Dental Association responded by providing mercury concentration testing to dental personnel. The average levels of mercury found in the blood and urine of these individuals were significantly higher than in the general population. Of the dentists tested, 30 per cent were shown to have symptoms of subclinical neuropathy, although none were affected to such an extent that they could not practice dentistry.⁵

Improved handling and hygiene procedures, including changes in amalgam preparation and an increased use of precautionary measures such as rubber dams, have decreased the mercury exposure of dental personnel and patients.¹³ Recent studies have demonstrated that dentists are less exposed to mercury than in the past.¹³ The levels of mercury in the blood and urine of dental personnel have dropped dramatically.⁵

A workplace standard, designated as the threshold limit value (TLV) and time-weighted average concentration (TWA), is set as a guideline for monitoring vapor levels. These values are based on the

mercury exposure that personnel can undergo during a 40-hour work week without suffering adverse effects. The mercuric TLV-TWA for an average adult and a pregnant female are listed as 0.05 mg/m³ and 0.01 mg/m³ respectively. A lower TLV-TWA value is designated for pregnant women because the effect of mercury on the foetus is unknown.¹⁴ Optimally, pregnant dental personnel who continue to work should ensure that the mercury vapors encountered in their work environment are essentially zero.¹⁵

Dentists and dental assistants are chronically exposed to mercury amalgam in the workplace.¹⁶ Research studies on the risks mercury vapor exposure pose to pregnant dental assistants are conflicting. In one study, dental assistants exposed to 0.08 mg/m³ of mercury had an increased incidence of spontaneous abortions. However, this study did not account for other risk factors in the dental setting.¹⁴

In another study, there was no correlation between the work environment of dental assistants and an increased spontaneous abortion rate.¹⁷ The data also showed that dental assistants were at no greater risk than the general population of giving birth to babies with neural tube defects. Provided pregnant dental personnel work in clinics that have proper hygiene practices, the risk to their foetuses will not be increased.¹⁷

The evidence suggests that even extraordinarily high levels of mercury vapor may not lead to abnormal foetal development. In one case, a dentist was exposed to a leaky amalgamator for approximately one year before she became pregnant. The highest level of mercury vapor measured in her office was 0.84 mg/m³. This reading, obtained near the amalgamator, is well above the workplace standard of 0.05 mg/m³.¹³ The dentist's blood and urine mercury levels remained high until after her pregnancy, but did not lead to teratogenicity.¹³

Although large amounts of mercury are teratogenic, the small amount released from amalgam restorations has not been proven to be harmful to the foetus. Widespread



use of amalgam seems to cause no ill effects in the general population. However, as a precaution, dentists are advised not to insert or remove fillings in pregnant patients.

Radiation Exposure

The dose to be given and the time of gestation are two important factors to consider in estimating the risk of dental X-rays to the foetus.¹⁸ Radiation doses of five rads or less are not associated with a significant increase in congenital malformations, and some sources maintain that even a dose of up to 10 rads is not teratogenic.¹⁵ However, a greater exposure, usually documented as over 15 rads, leads to a two to three fold increase in congenital malformations.¹⁵ The foetus is most susceptible to radiation between the second and sixth week of gestation.¹⁹ If the foetus is exposed to nuclear disaster levels of radiation during this time, there is an increase in spontaneous abortions, microcephaly, microphthalmia, cataracts, and mental and growth retardation.¹⁸ There is also a small potential risk of developing leukemia and malignant tumors later in life.²⁰

Pregnant Patients

The amount of radiation used in dental X-rays is well below the threshold dose.¹⁸ Since dental X-rays are directed at the jaw, the amount of radiation the foetus receives is minute.^{19,21} A single dental X-ray exposes the foetus to 0.01 millirads of radiation.²¹ The ionizing radiation the patient receives from one dental X-ray is less than the cosmic radiation acquired on a daily basis by a factor of 40.¹⁸ For these reasons, diagnostic radiation should not be withheld during pregnancy, and is optimally performed during the second trimester to increase patient comfort.^{19,22,23} Britain's National Radiological Protection Board (NRPB) states that considering the negligible amount of radiation the foetus is exposed to during routine dental care, the wearing of protective lead aprons is not essential.²⁴

A recent study shows that even though the risk from dental X-rays is minimal, 50 per cent of dentists con-

sult a patient's obstetrician before administering radiation.²³ Interestingly, 80 per cent of the dentists polled never take diagnostic X-rays during pregnancy, although almost all would use radiographs in an emergency situation.²³ This practice stems more from legal and emotional considerations rather than from a legitimate medical concern.²³

Pregnant Dental Personnel

Dental personnel often work around radiation equipment on a daily basis. The risk of congenital malformations appears to be insignificant due to the low amount of radiation associated with dental X-rays and the use of precautionary measures. With proper precautions, even pregnant radiologists, who are at a higher risk than dental personnel due to the frequency and dose of their radiation exposure, can work throughout their pregnancy.

Local Anesthetics (Lidocaine)

The most common local anesthetic used in dentistry is lidocaine combined with a vasoconstrictor.²⁰ Studies have shown that pregnant women have an increased sensitivity to local anesthetics, and that smaller amounts are needed to produce similar effects during pregnancy.²⁵ Local anesthetics also show a faster onset as well as a longer duration of action.²⁶ When injected intravenously, the anesthetic quickly enters the maternal circulation and is able to cross the placental barrier by passive diffusion, although the levels in the fetal circulation are too low to cause ill effects.^{19,27-30}

Local anesthetics have been used extensively in pregnant patients, with no proven adverse effects.²⁰ Most of the information available on the possible ill effects of anesthetics on foetal development is based on animal studies and known chemical mechanisms.¹⁹ Although the intravenous injection of lidocaine has been shown to cause birth defects in animals, this effect was not apparent when the drug was injected locally.^{15,20} The small amount of lidocaine used in dental treatment is unlikely to result in any adverse effects to the foetus, but dental

work requiring local anesthesia should be postponed until the second trimester of pregnancy for the comfort of the pregnant patient.²⁰

It has been suggested that prilocaine use should be avoided during pregnancy due to concerns about methaemoglobinemia in the foetus,³¹ but the risk is probably extremely low.³² Published human data on the effects of using other local anesthetic agents such as mepivacaine, bupivacaine, and articaine during pregnancy is limited.

Nitrous Oxide

Nitrous oxide gas has been widely used in dentistry for over 150 years, but its safety is now being debated.^{20,33} Although no increase in congenital malformations has been found, reduced fertility was noted in rats exposed to 500 ppm of nitrous oxide gas. Similar levels of nitrous oxide exposure are found in some dental clinics.³³

Pregnant Patients

Because short-term therapeutic exposure to nitrous oxide gas has not been shown to cause congenital malformations or fertility problems such as spontaneous abortions, it may be used with pregnant patients.¹⁵ However, until more information is available, the administration of nitrous oxide gas should be avoided during pregnancy unless it is deemed necessary. Chronic exposure may result in foetal loss and infertility, which is a possible concern for dental personnel.¹⁵

Dental Personnel

Chronic nitrous oxide gas exposure in the workplace has been linked to infertility, spontaneous abortions and congenital malformations.^{20,33-35} However, studies have been criticized and valid conclusions could not be made due to a response bias in the interviewed subjects.^{14,33}

A study published in 1980 found an almost two-fold increase in birth defects and spontaneous abortions in dental assistants.³⁵ Spontaneous abortions were also seen in 50 per cent of the female partners of male dentists.³⁵ The baseline risk of spontaneous

abortions in North America is at least 15 per cent.^{36,37} However, most studies demonstrate no link between nitrous oxide gas and teratogenicity in the fetuses of dental personnel compared to control groups.¹⁴

Recently, Rowland et al demonstrated that dental assistants were only 41 per cent as likely to conceive as the average population.³³ This decrease in fertility was noted where dental assistants were working for at least five hours a week in a clinical setting with unscavenged nitrous oxide gas.³⁵ Only women who eventually became pregnant were included in this study, however. As a result, it may have underestimated the effect of occupational exposure to nitrous oxide gas, since the females who did not become pregnant may have been infertile due to exposure.

The decreased fertility of individuals who are occupationally exposed to nitrous oxide gas may be caused by a blockage of the hormone secretion necessary for ovulation. Alternatively, the increase in their conception time may be the result of undetected early spontaneous abortions.^{33,34} Although these results are worrisome, a response bias may have occurred, as the women most concerned about unscavenged gas may have participated more actively in the study.³³

The problem seems to stem from clinics with unscavenged nitrous oxide gas. Scavenging can decrease nitrous oxide levels in the environment by at least 90 per cent. Although scavenging equipment has been available since 1978, only two-thirds of the 50 per cent of clinics which use nitrous oxide have installed it.³³ The workplace standard is set at a TLV-TWA of 50 ppm.¹⁴ Even in offices where scavenging equipment was used, nitrous oxide has been detected at levels of 100 ppm. In clinics where no scavenging equipment was used, levels of up to 1,000 ppm have been measured.³³ To decrease nitrous oxide gas exposure in dental clinics, it is important to monitor nitrous oxide

levels and to use effective scavenging equipment.³⁵

Antibiotics

The drugs of choice for mild to moderate infections related to complications from dental treatment are penicillin V and amoxicillin.^{1,26,38} These drugs are the safest and most commonly prescribed antibiotics during pregnancy.¹ They have been widely used for many years with no ill effects. Physiological changes during pregnancy may result in a lower serum concentration of drugs in the pregnant patient, but this only becomes significant in severe infections.¹ There are no studies showing penicillin to be teratogenic.^{15,28} In addition, penicillin V is cost effective, making it the drug of choice for most patients.³⁹ Amoxicillin has also been extensively used without any negative effects to the foetus.^{28,38}

Clindamycin is another antibiotic that is commonly prescribed for oral infections. In a surveillance study of Michigan Medicaid recipients, 647 newborns had been exposed to clindamycin during the first trimester. Major birth defects were observed in 4.8 per cent, which did not support an association between the drug and congenital defects.⁴⁰

Concern has been raised about the use of metronidazole during pregnancy due to suggestions of potential carcinogenic and mutagenic potential. However, current data do not support the hypothesis that metronidazole exposure in humans is associated with an increased risk of cancer.⁴¹ In addition, two recent meta-analyses concluded that this drug does not appear to be associated with an increased teratogenic risk.^{42,43}

Analgesics

Acetaminophen is widely accepted for use during pregnancy, and seems to be the analgesia of choice during all stages of gestation.²⁸ It is used for the treatment of mild to moderate pain and infection-mediated fevers⁴⁴ resulting from dental procedures. Administered at therapeutic doses, the drug is not associated with con-

genital malformations, and is believed to be safe for short-term use.^{15,38} If possible, chronic and large doses of acetaminophen should be avoided, because the effect on the foetus has not yet been established.¹⁵

Acetylsalicylic acid (ASA) is nonteratogenic, but may cause maternal and foetal hemorrhage, as well as prolonged labor, if given before parturition.^{20,26,45} The short-term use of ASA early in pregnancy does not seem to be detrimental to the foetus. Larger, chronic doses, particularly during the last trimester of pregnancy, may result in premature closure of the ductus arteriosus, foetal pulmonary hypertension, anemia and low birth weight.^{19,45,46} For these reasons, ASA is not recommended for routine use during pregnancy.^{20,47}

Ibuprofen is a nonsteroidal anti-inflammatory compound that inhibits prostaglandin synthesis. No studies have demonstrated an association between birth defects and the administration of this drug during pregnancy.²⁸ However, its use may lead to adverse circulatory effects in the foetus and should be avoided, particularly during the third trimester.^{20,28}

Codeine is a narcotic that may cause newborn withdrawal and respiratory depression if it is used late in gestation.^{19,20,46} Although a few studies have suggested a possible association between the use of codeine and congenital defects,²⁸ its short term use is likely not of concern.

Conclusion

In general, necessary dental treatments need not be withheld during pregnancy. Due to the lack of conclusive research, as a precaution amalgam fillings should not be removed or put into the mouths of pregnant patients.

Dental X-rays do not pose a foetal risk, and may be used in preventative and emergency dental treatments.

The possible teratogenicity of local anesthetics has not been studied extensively, but the relatively low levels of local anesthetic used in the clinical setting are not contraindicated.



Although the debate over chronic occupational exposure to nitrous oxide gas remains unresolved, following precautionary measures to limit the exposure of pregnant patients to this gas is recommended.

Antibiotics should only be used when necessary. When they are required, the safest drugs available (penicillin V, amoxicillin and erythromycin) should be prescribed.

Analgesics may be necessary for pregnant women undergoing dental treatment. The analgesic of choice appears to be acetaminophen administered in therapeutic doses. However, the use of aspirin, ibuprofen, and narcotic agents should be limited due to their perceived ill effects. ■

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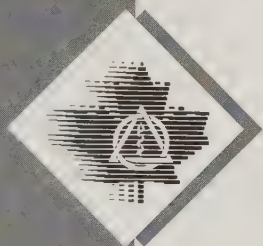


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CDA RSP — THE PERFORMANCE RRSP

The Canadian Dental Association Retirement Savings Plan

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CDA Fund Performance[†] (for period ending April 30, 1998)

CDA GROWTH FUNDS	1 year	3 years	5 years	10 years
Canadian				
Aggressive Equity Fund (Altamira)	30.8%	22.2%	n/a	n/a
Common Stock Fund (Altamira)	21.6%	12.9%	10.3%	9.4%
Canadian Equity Fund (Trimark) ^{††}	10.9%	15.5%	14.0%	12.5%
Special Equity Fund (KBSH)*	40.8%	39.8%	32.0%	0.0
International**				
Emerging Markets Fund (KBSH)	-18.5%	-7.8%	n/a	n/a
European Fund (KBSH)	42.5%	25.2%	n/a	n/a
International Equity Fund (KBSH)	14.5%	12.9%	n/a	n/a
Pacific Basin Fund (KBSH)	-9.4%	3.4%	n/a	n/a
US Equity Fund (KBSH)*	38.4%	28.1%	21.5%	17.8%
Global Fund (Trimark) ^{††}	21.1%	18.2%	19.2%	16.9%
CDA INCOME FUND				
Bond & Mortgage Fund (Canagex)	9.6%	10.1%	8.8%	10.2%
CDA CASH AND EQUIVALENT FUND				
Money Market Fund (Canagex)	3.3%	4.5%	4.7%	7.2%
CDA GROWTH AND INCOME FUND				
Balanced Fund (KBSH)	19.1%	16.5%	12.2%	10.8%

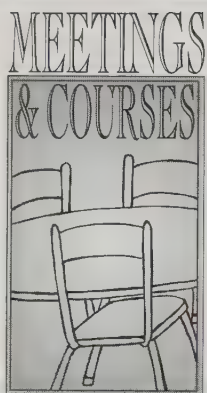
[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historical rates based on past performance and are not necessarily indicative of future performance.

^{††} The rates of return shown for the Canadian Equity Fund (Trimark) and the Global Fund (Trimark) are based on the returns of the Trimark Canadian Fund and the Trimark Fund respectively, the mutual funds in which those CDA funds invest. Returns are historical and are after deduction of management fees. As a result, the performance results differ from those published by Trimark Investment Management Inc.

* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

** These funds are subject to foreign content limitation.

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INTERNATIONAL



July 2-4

1st Chinese International Conference on Comprehensive Orthodontics in Nanjing, China. Contact Javisa International Ltd., 425 University Ave., Suite 301, Toronto, ON M5G 1T6. Tel. (collect): (416) 595-9877; fax: (416) 595-9565.

August 25-29

15th Jubilee "Ákrövy" Congress of the Hungarian Dental Association in Budapest, Hungary. Contact MOTESZ Congress Bureau, 1051 Budapest, Nádor u. 36., 1443 Budapest, Pf. 145 Hungary. Tel.: (36-1) 111-66 87; fax: (36-1) 183-79 18; e-mail: motesz@mail.elender.hu; internet: www.motesz.hu.

August 26-30

1998 New Zealand Dental Association Conference in Wellington, New Zealand. Contact Dr. W. Gaudie, Conference Secretariat, P.O. Box 5321, Wellington, NZ. Tel.: +64 4 384 7606; fax: +64 4 384 6594; e-mail: wmgaudie@clear.net.nz

September 8-11

135th British Pharmaceutical Conference in Eastbourne, England. Contact BPC Secretariat, Royal

Pharmaceutical Society of Great Britain, 1 Lambeth High St., London SE1 7JN, U.K. Tel.: 44 (0) 171 820-3241; fax: 44 (0) 171 735-7629.

October 1-3

3rd International Congress On Dental Law and Ethics in London, England. Contact Congress Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855.

October 8-12

86th Fédération Dentaire Internationale Annual World Dental Congress in Barcelona, Spain. Contact the Canadian Dental Association. Tel.: (613) 523-1770; 1-800-267-6354; fax: (613) 523-7736.

October 15-17

Microscope & Future — Multidisciplinary Symposium On the Use Of Microscopic Dentistry in Rome, Italy. Contact Mrs. Paola Mercaldo, G&G Congressi, 00143 ROMA, Via Tommaso Arcidiacono, 87, Italy. Tel.: 39 (06) 5043441 - 5043442; fax: 39 (06) 5033071.

CANADA



July 10-17

I.V. Conscious Sedation in Toronto, Ont. Contact The University of Toronto, Faculty of Dentistry, Continuing Dental Education, 124 Edward St., Toronto, ON M5G 1G6. Tel.: (416) 979-4902 ask for Kelly or Elizabeth; in Ontario: (800) 743-3788; fax: (416) 979-4941.

July 13-15

Forensic Odontology: Behind Every Story There is a Grain of Tooth — presented by the Summer Institute of Forensic Sciences in Ottawa, Ont. Instructors: David Sweet and Dean Hildebrand. Contact the

School of Continuing Education, 302 Robertson Hall, Carleton University, 1125 Colonel By Drive, Ottawa ON K1S 5B6. Tel.: (613) 520-3500; fax: (613) 520-4456.

July 16-19

Annual Meeting of the Canadian Association of Oral and Maxillofacial Surgeons in Vancouver, B.C. Contact CAOMS/ANZAOMS Secretariat, c/o Water Street Planning Group, Third Floor, 353 Water St., Vancouver, BC V6B 1B8. Tel.: 1-888-549-3301 (in Canada only), fax: (604) 681-1292.

July 30 - August 1

Aesthetics '98 — International Symposium on Excellence in General Practice and Aesthetic Dentistry in Whistler, B.C. Contact Ms. Debbie Larocque, McGill University. Tel.: (514) 398-7203, ext. 4165; fax: (514) 398-8900. Or contact Ms. Olga Chodan, tel.: (514) 398-7221.

August 26-29

34th Annual General Meeting of The Canadian Academy of Endodontics in Charlottetown, PEI. Contact Dr. Wayne A. Maillet. Tel.: (902) 494-5129; fax: (902) 494-2527; e-mail: w.maillet@dal.ca

September 10-12

6th Annual Meeting of The Canadian Academy of Restorative Dentistry and Prosthodontics in Winnipeg, Man. Contact Ms. Barb Malinowski, Executive Secretary to the CARDP 1998 Convention Chairman, 5-2230 McPhillips St., Winnipeg, MB R2V 3C8. Tel.: (204) 694-2042; fax: (204) 694-4052.

September 11-12

Partial Denture Design... Fundamentals with an Eye to Esthetic. Guest lecturers: Dr. Davis Charles and Dr. Paul Sills. Contact the University of Western Ontario, Faculty of Medicine and Dentistry,

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Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

September 11-13

Northern Ontario Dental Association Annual Convention in Timmins, Ont. Contact Dr. Don Francis. Tel.: (705) 264-9559; fax: (705) 264-2585.

September 19

Dental Materials Update — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

September 25-27

Annual Meeting Of the Canadian Academy Of Pediatric Dentistry in Calgary, Alta. Pediatric restorative materials. Presenter: Dr. Donly, University of Iowa. Contact Dr. Robert Barsky, 507-4600 Crowchild Trail N.W., Calgary, AB T3A 2L6. Tel.: (403) 247-3166; fax: (403) 247-2534.

October 2-3

Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632; fax: (519) 258-2637; e-mail: jberger@mnsi.net

October 2-3

What's New in Oral Health in Halifax, Nova Scotia. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5. Tel.: (902) 494-1674; fax: (902) 494-2527.

October 17

Prosthodontic Series #1 - Porcelain Fused to Metal Prosthesis — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development,

Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

October 23-24

Thompson Okanagan Dental Meeting in Kelowna, BC. Contact Alison Hall, Registration Coordinator. Tel./fax: (250) 832-2811; e-mail: alison@sunwave.net

October 30-31

Clinical Perio Series - Course #210 - Periodontal Surgery Workshop — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

November 8-13

Bermuda Symposium #6... Southampton Princess — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

November 21

Clinical Perio Series - #220 - Clinical Periodontics for Dental Teams — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

December 4-5

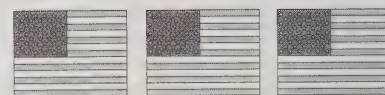
Annual Meeting of the Association of Prosthodontists of Canada in association with **The Greater New York Academy of Prosthodontics** in New York, NY. Contact

Ms. Jennifer Rogers. Tel.: (905) 305-9373; fax: (905) 886-8913.

December 5

Prosthodontics Series #2 - Bonded Prostheses — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; fax: (519) 661-3797.

U.S.A.



August 5-8

23rd American Academy of Esthetic Dentistry Annual Meeting: The Pursuit of Esthetic Excellence in Philadelphia, Pa. Contact AAED Headquarters, 1807 S. Washington St., Suite 106, Naperville, IL 60565. Tel.: (630) 355-0424; fax: (630) 355-0474.

September 13-18

84th Annual Meeting of the American Academy of Periodontology in Boston, Mass. Contact Melodie at (312) 573-3210; e-mail: melodie@perio.org

September 16-19

28th Annual Session of the American College of Prosthodontists — Current Controversies In Prosthodontics in San Diego, Calif. Contact ACP, 211 E. Chicago Ave., Chicago IL 60611. Tel.: 1-800-378-1260.

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DENTAL EDUCATION



Dental Education In Canada — What Lies Ahead?

David W. Banting, DDS, PhD

The Formative Days

Dentists first came to Canada in about 1800, principally from the United States along the New York-Boston-Montreal trade route. A few also arrived directly from England, but there were likely no more than a dozen dentists residing in Canada at that time. As Canada's population totalled about 320,000 in the early 1800s, the dentist:population ratio was roughly 1:27,000.

At the outset of the 19th century, dentistry was practised by four types of individuals: medical practitioners, who frequently performed dental extractions as an emergency service; medical school graduates who, after taking a dental apprenticeship, limited themselves to the practice of dentistry; young people who entered directly into an apprenticeship with an established dentist, and then eventually ventured forth on their own; and individuals who practised dentistry as a trade, pulling teeth as they moved from town to town.

In the profession's early days, secrecy kept communication and goodwill among dentists to a minimum; flagrant advertising made it difficult to gain the confidence of the public; and price-cutting was common. Because fees were low, den-

tists frequently worked a second job (usually blacksmithing).

The first dental school in Canada was privately operated. Located in Toronto, the Canada College of Dentistry was not a financial success, and only survived for a year or two. It was the first and last attempt to establish a for-profit private dental school in Canada.

In 1875, the Royal College of Dental Surgeons of Ontario (RCDSO) established a new dental school in Toronto. At the time, dentistry did not command a great deal of respect among the medical community. Many dentists were concerned that if dentistry became a branch of medicine, and dental training was incorporated into a medical school, it would receive little attention.

As a result of these concerns, RCDSO's school of dentistry was affiliated with the University of Toronto in 1888. Since then, nine additional dental schools have been established in Canada — all within universities and all separate from medicine (Table I).

Our Present Environment

Changes are taking place in society today that will have a significant impact on dentistry in the years and decades ahead. Consumers of dental services are bet-

ter informed, and will be even more knowledgeable in the future.

Until recently, if a patient wanted information about dentistry, the primary source of this knowledge was the dental office. Today, there are magazine articles, books and television documentaries on a wide spectrum of health issues, including dentistry, as well as the Internet.

Professional organizations and regulatory authorities are now developing consumer information services. Ultimately, the public will have significantly greater access to formal statements and positions on the health risks and benefits associated with products and materials, guidelines on the standards of good practice, and even information on discipline proceedings.

Patients want to be involved in treatment decisions, and they are demanding to be fully informed. As they become informed consumers, they will have an enormous impact on how treatment decisions are made and what care is provided.

Elements of managed care are increasingly being applied to dentistry's current fee-for-service payment system. Watchers of the health care industry recognize that there is a trend away from acute care toward primary care (i.e. rather than treating illness, the health care

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professions are focusing on the maintenance of wellness and the management of disease). There is increasing reliance on outcome measures to determine the appropriateness and sufficiency of treatment, and fragmented personal health services are being replaced with patient-centred care. More information on provider quality measures will be made available and accessible to help consumers, third parties, and regulatory authorities make knowledge-based choices, comparisons and decisions.

The day may come when patients carry swipe cards for identification and access to health services, as well as to allow access to their personal health care and medication histories. Information about all proposed treatment will routinely be transmitted to third-party carriers to determine what portion, if any, of the related costs are covered by the patient's dental benefit plan, and third-party carriers will provide "report cards" that profile dental practitioners.

Increasingly, treatment will become "outcome" oriented, and utilization reviews will be routine. Dentists whose treatment does not result in positive and lasting outcomes could be sanctioned in an effort to control and minimize the costs of dental care.

Technology and technological innovations are advancing at an accelerated rate. Many of the technologies available today have not been fully applied to dental practice. Imaging, laser technologies and computer/television/telephone technology are a few leading examples. The technology and infrastructure required to allow real time audio and video consultations, with instantaneous transfer of text, photographic and radiographic images, are already available. It is now technologically possible for an expert on the other side of the world to manipulate a device here in Canada, and perform a complex, microsurgical treatment. The not-so-insignificant issue of licensing and regulation would have to be resolved, but the

Table 1

Development Of Dental Schools In Universities Within Canada

Year Established	Original Name	Faculty of Dentistry
1875	Royal College of Dental Surgeons	University of Toronto (1925)
1892	Dental College of the Province of Quebec	McGill University (1920) Université de Montréal (1921)
1908	Maritime Dental College	Dalhousie University (1912)
1918	Department of Dentistry Faculty of Medicine	University of Alberta (1942)
1958		University of Manitoba (1958)
1964		University of British Columbia (1964)
1966		University of Western Ontario (1966)
1968		Université Laval (1968) University of Saskatchewan (1968)

possibilities presented by this type of technology are endless.

We also need to consider the demographics of our society, and the information provided by epidemiological studies on dental disease. Many Canadians are "baby boomers". This group, born between 1946 and 1964, accounts for one-third of Canada's population. It also represents a watershed with respect to dental disease.

Canada's population projections for the next 50 years indicate that the country will continue to grow from its current level of 29.5 million residents to reach 35.4 million residents in 2044-48. The other factor to consider is the portion of the Canadian population who are less than 30 years of age (**Fig. 1**). By the year 2036, this group will account for 80 per cent of Canada's population. This is important, because the individuals in this group will have enjoyed the

benefits of widespread exposure to fluoride, better nutrition, and better health care information.

The under 30 group is quite different from the baby boomer generation in many respects. This is particularly true with respect to its risk of experiencing dental disease. The facts are irrefutable. Dental caries in 13-year-old Ontario children has declined dramatically. In 1973, only 10 per cent were caries-free, compared to 49 per cent in 1991. This trend is seen in virtually all Canadian provinces, as well as in the United States, Great Britain, Scandinavia, Australia and even China. It is a direct result of the fluoride exposure that began in the 1960s. Provided this exposure continues, by 2020 virtually all 13-year-old children will be caries free.

The decline in adult tooth loss has been equally dramatic. In 1961, 30 per cent of 55-64 year olds in the U.S. had lost their

natural teeth, compared to just 15 per cent in 1986. By 2010, the proportion of middle age, edentulous adults will be considerably less than 10 per cent.

The incidence of destructive periodontal disease, defined as one or more pockets of greater than 3.0 mm in depth, has remained rather stable over the past 30 years. Only 25 per cent of the U.S. population, approximately, have at least one pocket exceeding 3.0 mm in depth.

The incidence of oral cancer, potentially the most serious dental disease, has also been comparatively stable. In any given year, new cases of oral cancer have occurred in somewhere between six and nine individuals per 100,000 population since 1971.

The message is clear. Although the baby boomers will continue to be a prominent segment of our population, barring any new dental disease, and assuming that the present trends continue, 80 per cent of the population will have almost all of their remaining natural teeth in 2036, with virtually no dental caries experience. Only one in five adults will have periodontal pockets exceeding 3.0 mm in depth, and about six in

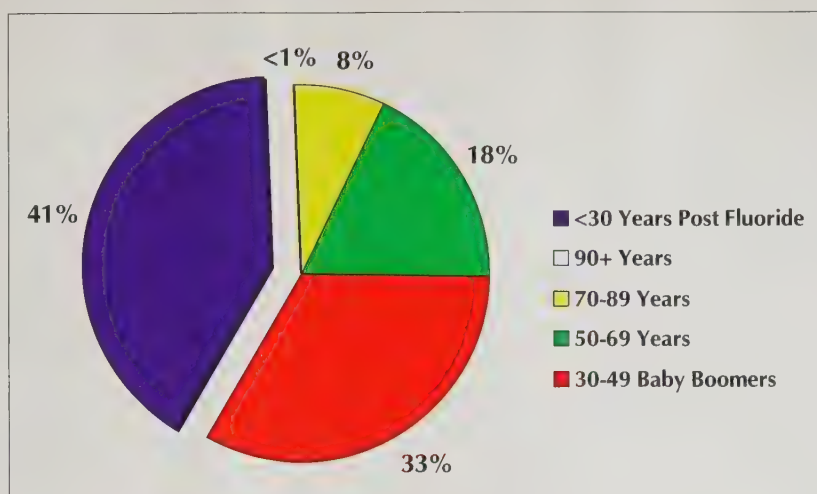


Fig. 1: Population by age group, Canada, 1995.

100,000 persons will get oral cancer each year (Fig. 2).

Future Dental Practice

Individually and collectively, these trends will have an impact on the future practice of dentistry. In the near term, clinical dentistry will emphasize prevention, cosmetics, implants, new dental materials and complex rehabilitative procedures. It will concentrate on population groups with special needs, such as older adults and medically compromised patients of all ages.

There will be an increased use of and reliance on technology

(CAD/CAM, fibre-optics, lasers, ultrasound, and sophisticated imaging techniques), as well as an intensified search to provide a scientific basis for much of what dentists now do empirically. In the mid to long term, the importance of oral health to overall general health will become increasingly meaningful, and dentistry will be much more focused on problems associated with general morbidity and mortality.

Cellular and molecular approaches to diagnosing and treating orofacial diseases will revolutionize dental care. More clinical chairside

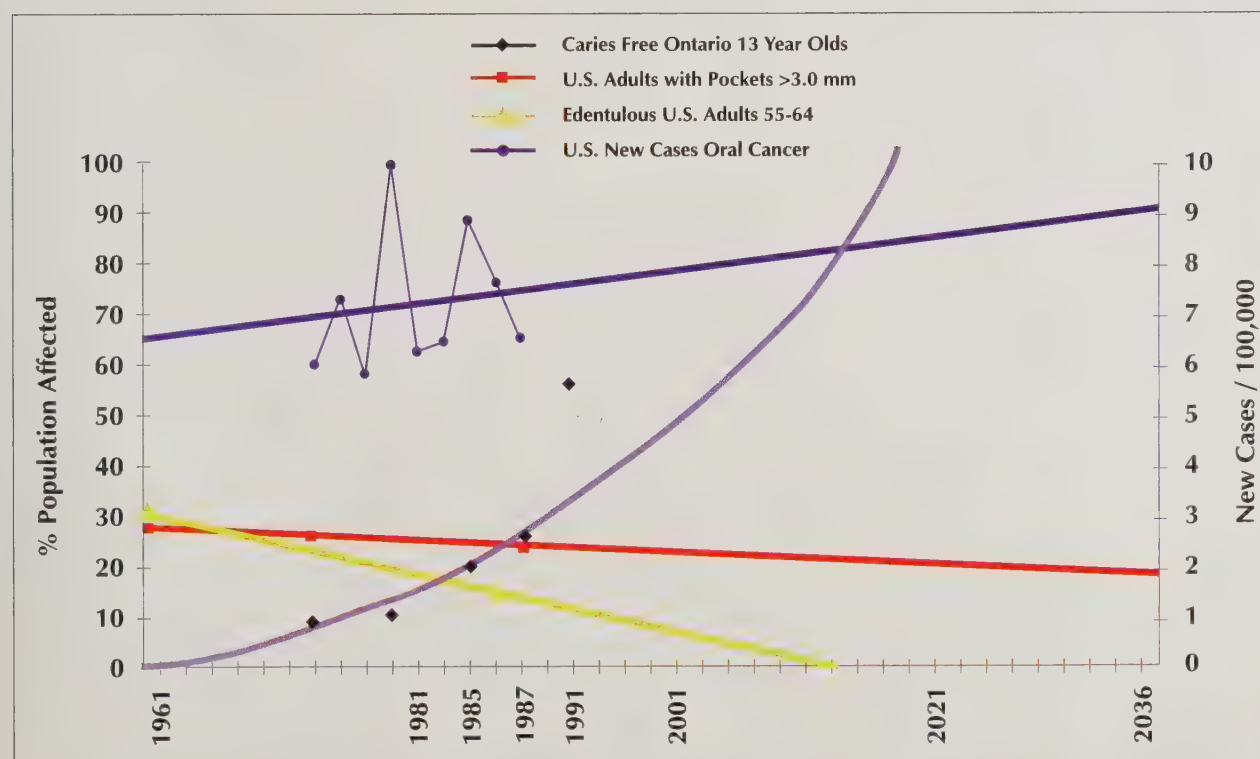


Fig. 2: Dental disease trends.

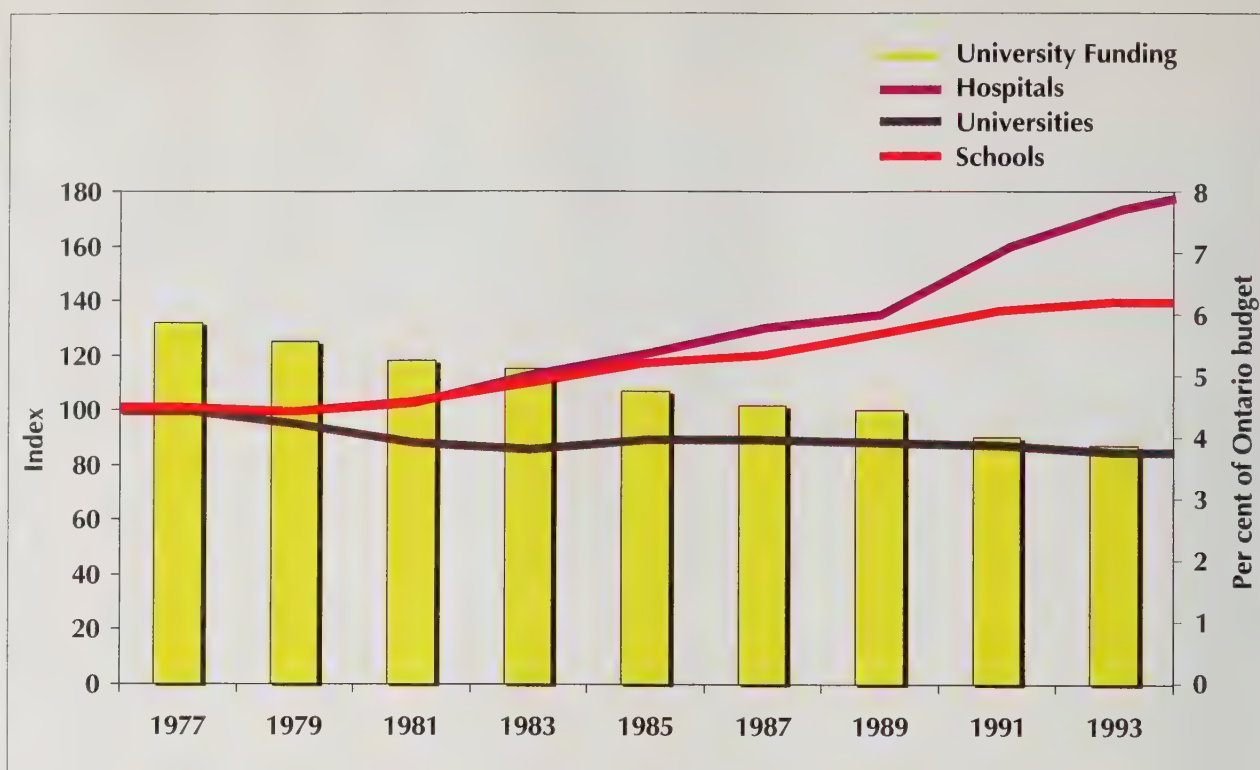


Fig. 3: University funding and expenditures per client served, Ontario.

time will be devoted to sophisticated screening procedures, early diagnosis of disease, and chemotherapy as a treatment mode. Dentistry will eventually find a place in the biomedical community as an accepted and respected specialty area within medicine.

Dental Education — The Present Reality

In addition to the global environment, dental schools must also operate in the microenvironment of the post-secondary education system. The reality of this microenvironment is such that:

- Continuing fiscal restraint within the public sector will result in a deteriorating funding base, which will create conflicts within the university regarding the allocation of resources between traditional academic programs and professional academic programs.

Ontario universities have experienced a decline in funding since 1977 compared to hospitals and public schools, which have enjoyed increased support. As a percentage of the total Ontario budget, university funding decreased from six per cent to four per cent from 1977-1993 (Fig. 3).

- Traditional dental education delivery models will become increasingly inappropriate, and educational institutions will be held accountable to the public and to the profession for the quality of their programs to a much greater extent.
- Relationships with other health care institutions, educational institutions, regulatory authorities and government organizations outside the university will become increasingly collaborative.
- Dental students will become more demanding and critical of teaching delivery and assessment methods as tuition costs increase.

What the Future Holds For Dental Education

The trend in post-secondary education, including dental education, will be to rationalize or integrate services and facilities within universities and even between universities in an effort to improve efficiency and reduce costs.

A number of structural and tactical approaches could be considered for dental education, such as:

- Combining the dental programs of two or more dental schools in a province or region.

- Incorporating dentistry as part of a multidisciplinary academic health science centre within the university.
- Integrating undergraduate medical and dental education.
- Making dentistry a "full cost recovery" program associated with a university.
- Establishing dentistry as an independent, private, educational program.

These and other plausible future models for dental education will need to be considered in relation to each university's own unique situation. It is unlikely, however, that the same model would be appropriate and acceptable to all universities.

There may be fewer dental schools in the future or resources may be shared by several different schools. This will present a number of difficulties. Moving people is a major undertaking, and they prefer to live in certain areas. Information technology could be a way to get around these problems, and still provide the necessary and appropriate expertise, by bringing external resources to dental schools on-line. It is technically

possible for a clinician in Victoria to provide instruction to all dental schools in Canada, simultaneously and interactively.

There is no need for this type of expertise to be replicated at each dental school. Presentations can be "beamed in" from dental offices, laboratories, or another educational institution. Dentistry is sufficiently similar in all of North America that "packaged," self-instructional programs of learning can be creatively developed, widely distributed, and used in all undergraduate dental curricula. Most preclinical teaching could be done by computer simulation. Students would learn how to retrieve necessary information regarding a patient, a medical condition, a probable diagnosis, and possible treatment options on their own, and be expected to do so.

Academic units will need to seek innovative ways to reduce costs, enhance learning, and provide better service. Learning to do more with less in academia will become a way of life. Faculty members will be challenged to work and learn together to find new approaches to dental teaching, as well as enterprising solutions to problems. Some examples might be the adoption of an 11 month annual academic session, a "flexi" course based on comprehensive competency evaluations that would allow students to progress at their own rate, and the reinstatement of a preceptorship model or some variant of it.

Students entering dental school will be much more sophisticated technologically. They will already be "Nintendo surgeons," with highly developed hand-eye coordination. As a result, they will quickly become bored with today's passive style of dental education, and will demand more stimulation and challenge. The classroom of the future will be filled with computers. Notes and manuals will be provided on-line or on compact disks rather than on paper. Didactic, group lectures will still be presented occasionally, but usually only when there is no other method of teaching available. Testing will also be done by

computer, and through simulated clinical situations. Professors will be managers of learning rather than the source of all knowledge.

In the future, dental schools must seek ways to benefit more from their proximity to medical schools, teaching hospitals, and other academic units within the university in an effort to enhance their scientific depth and breadth, rigor and sophistication. Research within dental schools will need to become increasingly collaborative, and involve academic disciplines that have not traditionally been associated with dental research, such as engineering, chemistry (optics, surface science), biophysics, law and business. The emergence of multidisciplinary research groups will be fostered to attract funding from both industry and government, as well as to address problems of greater complexity, diversity and application rather than dentistry's traditional areas of interest.

Scholarly activity must continue to be a primary objective of dental schools, and a valued requirement of their faculty members. To this end, dental schools must attract their fair share of research funding and generate ample scholarly activity.

Scholarly activity also includes keeping abreast of new developments and continually incorporating them into the teaching program. Scholarship is not only discovery, it is also integration, teaching and application, and must be a central focus of a formal program of faculty development. It is essential to create an environment that encourages continual questioning and the seeking of answers. Every faculty member must be involved in some way in asking questions, seeking answers and extending knowledge.

Some changes are necessary, however, in the type of research that will be undertaken by dental schools in the future. The interests of dental research must venture beyond the narrow confines of dentistry to the general academic community. Dental researchers will increasingly need to ask questions and develop research strategies that are not only relevant for dentistry, but

also have much broader medical and health-related applications. The trend in dental research is to extend its reach beyond the limits of the traditional dental diseases. Although there are only a few tissues and organs that are specific to the orofacial complex, which will continue to be of primary interest to dental researchers, the oral cavity contains many other tissues and components that are common to the body in general. In this respect, the oral cavity presents a clinical and biological laboratory that has great potential for future research of much wider significance than oral diseases.

Research results should be quickly incorporated into both undergraduate and post-graduate program curriculums. This will require the undergraduate curriculum to be updated on an ongoing basis. In addition, the dental practitioners who participate in postgraduate education must be on the leading edge of new techniques, technology and information. This is how dental practice will be influenced and directed in the future.

Increased emphasis on retraining and upgrading as a result of the development and implementation of clinical standards of care could lead to a new and expanding role for dental schools, likely in partnership with dentistry's regulatory authorities and professional bodies.

The competency of practising dentists will need to be evaluated on a regular basis to ensure that it remains at least at the level of the graduating student. No one can do this better than the dental schools. However, for both economic and political purposes, dental schools will be forced to contract with large dental supply or manufacturing companies, which can provide the full range of necessary materials and supplies to the school as well as research and development funding.

And finally, there will be an increasing expectation by regulatory authorities, the public and universities for dental schools to be on the leading edge of change, and play the role of agents of change in dentistry.

One way to accomplish this is to restructure the content and emphasis of the under graduate and graduate curricula. Students



Today I learned something new from an old friend.

You know, Thelma and I have been best friends since high school. Well, because Thelma is such a close friend, I thought I knew everything about her.

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should be taught to learn independently, to critically evaluate the dental literature, to access and process vital information, and to make appropriate and ethical clinical decisions. The emphasis in the curriculum should reflect the future requirements of dental practice, as determined by dental disease patterns, the characteristics of the population, and the changing environment in which we live. The role of a dental school should be to determine the future direction of dental practice — wherever that leads — and not simply to reflect the current mode of practice in the community. ■

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ACTION AND CLINICAL PHARMACOLOGY

Clindamycin exerts its antibacterial effect by causing cessation of protein synthesis and also causing a reduction in the rate of synthesis of nucleic acids.

Absorption

Clindamycin is rapidly and almost completely absorbed from the gastrointestinal tract in man and peak serum levels are seen in about 45 minutes. The average peak serum level following a single 150 mg dose in adults is 2.74 mcg/mL. Therapeutically effective average levels at 6 hours after a 150 mg dose of 0.73 mcg/mL are found.

The absorption of clindamycin is not appreciably affected by food intake. Peak serum levels following a single 250 mg oral dose of clindamycin with the patient in the fasting state were 3.1 mcg/mL at 45 minutes whereas the same dose administered with food gave a peak level of 2.4 mcg/mL. A 250 mg dose administered one hour after food gave a peak level of 2.8 mcg/mL but this peak did not occur until two hours after administration of the medication. A 250 mg dose with the patient in a fasting state and with food administered one hour after the medication resulted in peak levels of 3.1 mcg/mL at 1 1/2 hours.

Excretion

The 48 hour urinary excretion of clindamycin in adults following a single dose of 150 mg represented 10.9% of the administered dose (range 4.8% to 12.8%). These measurements were made by bio-assay and both the percent recovered and the urinary concentration are quite variable. The urinary concentration following a single 50 mg dose of clindamycin in the first 24 hours ranged from 8 to 25 mcg/mL of urine.

Fecal excretion of clindamycin has also been determined. Patients on a three week study when administered 1 gram of clindamycin per day had an average of 283 mcg/gm of stool. Patients on lincomycin 2 grams per day under the same conditions showed 3980 mcg/gm of stool. In single dose studies following administration of 250 mg of clindamycin, only 2.7% of the dose was excreted in the feces in 48-96 hours.

Tissue Penetration

In three patients following the administration of 150 mg of clindamycin serum levels reached 2.25 mcg/mL in 2 hours and declined to 1.5 mcg/mL at 4 hours. During this period antibiotic synovial fluid levels were 1 mcg/mL at 2 hours and remained unchanged for the next and last 2 hours of observation .

Various other body fluids and tissues were also assayed for clindamycin and the results of these assays and serum levels at the same time are recorded in Table 1.

TABLE I				
Specimen	No. of Specimens	Average Serum Level	Average Fluid Level mcg/mL	Tissue Level mcg/g
Pancreatic fluid (C6-264)	4	1.15	45.1	
Bile (C6-264)	19	3.35	52.45	
Gall Bladder (C6- 24)	16	0.81		4.33
Liver (C6-265)	1	42.35		3.80
Kidney (C6-265)	1	1.50		9.07
Bone (C4-390)	2	2.44		9.91

INDICATIONS AND CLINICAL USE

Dalacin C (clindamycin hydrochloride) is indicated in the treatment of serious infections due to sensitive anaerobic bacteria, such as *bacteroides* species, *peptostreptococcus*, anaerobic streptococci, *clostridium* species and microaerophilic streptococci.

Dalacin C is also indicated in serious infections due to sensitive gram-positive organisms (staphylococci, including penicillinase-producing staphylococci, streptococci and pneumococci) when the patient is intolerant of, or the organism resistant to other appropriate antibiotics.

DALACIN C is indicated for prophylaxis against alpha-hemolytic (viridans group) Streptococci before dental, oral and upper respiratory tract surgery.

a) The prophylaxis of bacterial endocarditis in patients allergic to penicillin with any of the following conditions: congenital cardiac malformations, rheumatic and other acquired valvular dysfunction, prosthetic heart valves, previous history of bacterial endocarditis, hypertrophic cardiomyopathy, surgically constructed systemic-pulmonary shunts, mitral valve prolapse with valvular regurgitation or mitral valve prolapse without regurgitation but associated with thickening and/or redundancy of the valve leaflets.

b) Patients taking oral penicillin for prevention or recurrence of rheumatic fever should be given another agent such as clindamycin, for prevention of bacterial endocarditis.

CONTRAINDICATIONS

As with all drugs, the use of Dalacin C (clindamycin hydrochloride) is contraindicated in patients previously found to be hypersensitive to this compound. Although cross-sensitization with Lincocin® (lincomycin hydrochloride) has not been demonstrated, it is recommended that Dalacin C not be used in patients who have demonstrated lincomycin sensitivity.

Until further clinical experience is obtained Dalacin C is not indicated in the newborn (infants below 30 days of age), or in pregnant women.

WARNINGS

Some cases of severe and persistent diarrhea have been reported during or after therapy with Dalacin C (clindamycin hydrochloride). This diarrhea has been occasionally associated with blood and mucus in the stools and has at times resulted in acute colitis. When endoscopy has been performed, some of these cases have shown pseudomembrane formation.

If significant diarrhea occurs during therapy, this drug should be discontinued or, if necessary, continued only with close observation. Significant diarrhea occurring up to several weeks post-therapy should be managed as if antibiotic-associated.

If colitis is suspected, endoscopy is recommended. Mild cases showing minimal mucosal changes may respond to simple drug discontinuance. Moderate to severe cases, including those showing ulceration or pseudomembrane formation should be managed with fluid,

electrolyte, and protein supplementation as indicated. Corticoid retention enemas and systemic corticoids may be of help in persistent cases, anticholinergic and antiperistaltic agents may worsen the condition. Other causes of colitis should be considered .

Studies indicate a toxin(s) produced by *Clostridia* (especially *Clostridium difficile*) may be a principal cause of clindamycin and other antibiotic-associated colitis. These studies also indicate that this toxigenic *Clostridium* is usually sensitive *in vitro* to vancomycin. When 125 mg to 500 mg of vancomycin were administered orally four times a day for 5 - 10 or more days, there was a rapid observed disappearance of the toxin from fecal samples and a coincidental recovery from the diarrhea.

It should be noted that serious relapses have occurred up to one month after apparently successful treatment. A relatively prolonged period of continuing observation is therefore recommended.

PRECAUTIONS

Dalacin C (clindamycin hydrochloride) like any drug, should be prescribed with caution in atopic individuals.

The use of antibiotics occasionally results in overgrowth of non-susceptible organisms – particularly yeasts. Should super-infections occur, appropriate measures should be taken as dictated by the clinical situation.

As with all antibiotics, perform culture and sensitivity studies in conjunction with drug therapy.

Since abnormalities of liver function tests have been noted occasionally in animals and man, periodic liver function tests should be performed during prolonged therapy. Blood counts should also be monitored during extended therapy.

Dalacin C may be used in anuretic patients. Since the serum half-life of clindamycin in patients with impaired hepatic function is greater than that found in normal patients, the dose of Dalacin C should be appropriately decreased. Hemodialysis and peritoneal dialysis are not effective means of removing the compound from the blood. Periodic serum levels should be determined in patients with severe hepatic and renal insufficiency.

ADVERSE REACTIONS

Only 65 of the 851 patients treated for infections developed side effects representing 7.6% of the total study group or 8.0% of the 813 patients with follow-up. Only 22 of these patients' symptoms were considered due to Dalacin C (clindamycin hydrochloride) for an incidence of 2.7% among the 813 cases with follow-up.

Gastrointestinal: Abdominal pain occurred in 12 patients for an overall incidence of 1.4% in 851 patients and was considered drug related in 7 (0.8%).

Diarrhea occurred in 22 cases for an overall incidence of 2.6% and was drug related in 13 (1.5%). Vomiting occurred in 14 cases with an overall incidence of 1.6%. Seven patients (0.8%) had nausea which was drug related in 2 cases (0.2%). Side effects were severe in 10 instances. (See also under "WARNINGS"). Esophagitis, at times severe, has been reported.

Hemopoietic: Transient neutropenia (leukopenia) has been reported. Its relationship to therapy is unknown. No irreversible hematologic toxicity has been reported.

Skin and Mucous Membranes: Skin rashes have been reported in 6 patients (0.7%), none of which could be determined as drug related. One case of urticaria was reported but its relationship to drug therapy could not be determined.

Liver: Although no direct relationship of Dalacin C to liver dysfunction has been noted, transient abnormalities in liver function tests (elevations of alkaline phosphatase and serum transaminase) have been observed in a few instances.

SYMPTOMS AND TREATMENT OF OVERDOSAGE

No cases of overdosage have been reported. It would be expected however, that should overdosage occur, gastrointestinal side effects including abdominal pain, nausea, vomiting and diarrhea might be seen. During clinical trials one 3-year old child was given 100 mg/kg of Dalacin C (clindamycin hydrochloride) for five days and showed mild abdominal pain and diarrhea. One 13-year old patient was given 75 mg/kg for five days with no side effects. In both cases laboratory values remained normal.

Overdosage should be treated with simple gastric lavage. No specific antidote is known.

DOSAGE AND ADMINISTRATION

Adults: 150 mg every 6 hours.

Moderately severe infections: 300 mg every 6 hours.

Severe infections: 450 mg every 6 hours.

Children (over one month of age) :
One of the following two dosage ranges should be selected depending on the severity of the infection:

1. 8-16 mg/kg/day (4-8 mg/lb/day) divided into 3 or 4 equal doses.
2. 16-20 mg/kg/day (8-10 mg/lb/day) divided into 3 or 4 equal doses.

Absorption of Dalacin C (clindamycin hydrochloride) is not appreciably modified by ingestion of food and may be taken with meals.

To avoid the possibility of esophageal irritation, Dalacin C capsules should be taken with a full glass of water.

For prevention of endocarditis: Adults: 300 mg orally 1 hour before procedure; then 150 mg 6 hours after initial dose. **Children:** 10 mg/kg (not to exceed adult dose) orally 1 hour before procedure; then 5 mg/kg 6 hours after initial dose.

Note: With β -hemolytic streptococcal infections, treatment should continue for at least 10 days to diminish the likelihood of subsequent rheumatic fever or glomerulonephritis.

AVAILABILITY OF DOSAGE FORMS

Each capsule contains clindamycin hydrochloride hydrate equivalent to 150 mg or 300 mg clindamycin base. Supplied in bottles of 100 and 500 capsules.

Further product information available on request. 17/08/95

References :

1. Sanford JP et al. The Sanford: Guide to Antimicrobial Therapy (26th ed.) 1996
2. Zambrano et al. Clindamycin in the Treatment of Human Infections 1992. 10 1-24
3. Penicillin Product Monograph: CPS, 32th edition, 1997, CPh A.



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NOVA SCOTIA - Sackville Area: Dental practice for sale in the Sackville area. Three fully equipped operatories with nitrous oxide and a fourth ready to grow! Fully computerized, with a top-of-the-line dental management software package. This well-established general practice of 22 years is located inside a house, giving a potential purchaser many options. The practice has constantly grossed over \$300,000 for many years. For further information contact: Bill Tingley, tel. (800) 565-1502 or (902) 835-1103, in Halifax area. D238

NOVA SCOTIA - Dartmouth: Must see! Modern, high quality family dental practice. Located in very active business park. Efficient computerized recall system in place. Well established with good income potential. For more information contact: Bill Tingley, (902) 835-1103 or 1-800-565-1525 within Nova Scotia. D052

ONTARIO - Burlington: Opportunity for periodontist/endodontist to take over existing 1,500 sq. ft. office with five operatories, three fully equipped, Panorex and Exan. Very inexpensive. Can also purchase small professional building. Contact: Janice, tel. (905) 639-5102. D282

ONTARIO - Ottawa Valley: Offering associateship/ownership. Owner wishes to relocate to western Canada but willing to associate to smooth transition. Established main clinic plus satellite office with strong patient base (4,000 +). Both offices fully equipped, computerized. Main office - four operatories, satellite - three operatories. Excellent staff. Affordable purchase price, financing available to purchase one or both practices. Unbeatable rural lifestyle. Tel. (613) 584-1179. D283

ONTARIO - Toronto: Crown and bridge and family practice. Pankey philosophy. Centrally located, modern facility, six

operatories, computerized, panorex, intraoral camera and more. Excellent clientele and area. Municipal parking in building. Steps from subway. Wonderful team-oriented staff. Could support two dentists. \$900,000 gross. Associate buy-in available. Please fax reply to: (416) 363-6000. D249

ONTARIO - North Toronto: Opportunity to relocate or "right-size" for an established dentist or certified specialist. New graduates are also welcome. Modern, established office. Centrally located in North Toronto. Flexible schedule. Reply to: CDA Classified Box #2737. D217

QUEBEC - Montreal: Dental space available. Two completely equipped, modern operatories for rent. Situated in a downtown medical/dental building. Tel. (514) 842-1124. D205

SASKATCHEWAN - Rural: Well-established, busy, modern general practice for sale. Three operatories and a private office. Only dentist in town with a large drawing area. Opportunity to practise all types of dentistry; 1,000 active patients. Town is close to major centres. Owner retiring. Priced to sell. Reply to: CDA Classified Box # 2745. D272

Positions Available/Sought

ALBERTA - Grande Prairie: Excellent associate opportunity available immediately. A modern, expanding family clinic in a rapidly growing city. Averaging 100+ new patients per month. Please call (403) 539-1151 or fax (403) 532-5116. D203

ALBERTA - Valleyview: Full-time associate position available to new or experienced dentist in the Peace River Region of Alberta. All phases of dentistry performed. Current practitioner is fully booked in excess of four months. Position available immediately. Please fax resumes to: (403) 524-2299 or call Dr. Darryl R. Smith at (403) 524-3864 (bus.), (403) 524-4454 (res.). D259

BRITISH COLUMBIA - Duncan: Busy general practitioner requires associate with 2 - 3 years experience to help provide full range of dental services. Must be personable, caring and motivated and enjoy quality dentistry. Practice located 45 minutes north of Victoria in the beautiful Cowichan Valley. Please send resume to: Dr. Philip Collinson, 202 - 149 Ingram St., Duncan, BC V9L 1N8. D284

BRITISH COLUMBIA - Vancouver: City centre. Endodontist required to join prosthodontist and periodontist. Please fax your resume to (604) 877-0499. D280

BRITISH COLUMBIA - Invermere: Life opportunity. Come share my busy practice in the Rocky Mountains. I would like to lighten my load and slow down. I am looking for an experienced, motivated and committed dentist to share and take over my practice. Wonderful town, wonderful place. Contact: Dr. Don Miller, tel. (250) 342-3811. D296

MANITOBA - Swan River: Associate wanted with view to purchase within 1 - 2 years. Well-established, busy general practice in west-central farming community. Five operatories, 4-day work week, long-standing friendly staff. Approximately 30 new patients monthly. Call (204) 734-4756 or (204) 734-2371, after 6 p.m. D288

MANITOBA - Oakbank: Part-time associate wanted for modern, rapidly growing practice. This attractive office is located 20 minutes from Winnipeg, a rapidly growing family oriented town. Successful candidate must be highly motivated, caring, gentle and like working with children. A minimum of 2 years experience is required. Tel. (204) 989-2231, please leave message. D278

NEW BRUNSWICK - Fredericton: This large and growing family practice is looking for the right associate/partner to practise quality dentistry in this charming down-home city. Fredericton is a cultural university city situated at the gateway to the magnificent Lower St. John River System. Position is available immediately. Experience preferred. Please call (506) 458-9060, (506) 450-8114. D294

NORTHWEST TERRITORIES - Yellowknife: Canadian licensed dentists. Full-time associate position available in Yellowknife. Modern, computerized, centrally located clinic. Travel to outlying communities necessary. Exciting opportunity. Forward resume to: PO Box 2615, Yellowknife, NT X1A 2P9 or fax (867) 873-5032. D267

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to: CDA Classified Box # 2705. D012

NORTHWEST TERRITORIES - Kugluktuk: Canadian board-certified dentist required for part-time, full-time position. Emphasis on quality, gentle dentistry. Please apply to: PO Box 274, Kugluktuk, NT X0E 0E0, or fax resume to (867) 982-4512. D162

ONTARIO - Toronto: Cost-sharing opportunity. Looking for dentist with existing patient base who wishes to relocate in downtown Toronto practice. Excellent staff, strong hygiene program. Across from the Faculty of Dentistry. For further information, please contact: Karen, tel. (416) 597-0411. D279

ONTARIO - Sault Ste. Marie: Excellent associate opportunity. Successful group practice seeking dynamic and caring individual to join their team. Emphasis on quality and preventative care. Hi-tech computer system and equipment. Position available immediately. Buy-in option for the right individual. Please call Greg at (705) 945-8272. D235

ONTARIO - Windsor: Dr. Sandor is looking for an experienced, full-time associate with option to buy in. For enquiries: tel. (519) 974-6120, fax (519) 974-6121. Ask for Gabe. D292

ONTARIO - Cambridge: Endodontist - excellent opportunity! Full or part time in well-established, new facility, multispecialist office. Growing community of 102,000. General anesthesia available. No investment required. Please contact: M. Viol, tel. (519) 623-3810 or fax (519) 623-1760. D240

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Something To Talk About

Luc Dugal, DMD

A few years ago, "Something To Talk About" was the title of a very popular country song. Now it seems to be the best way to describe the current trends in Canadian dentistry.

Certainly, there has been a great deal of discussion concerning the Alberta Dental Association's recent decision to forego publishing an annual suggested fee guide, and Ontario dentists appear to be undecided on the best way to structure their fees.

With constant attacks on fees being launched from a number of fronts, including managed care, it may be time for dentists to step forward and accept personal responsibility for their actions. Dentists have long relied on their provincial associations to set fees. That was not always the case, however. Prior to the development of procedure codes and fee guides, dentists based their fees on value.

There is no doubt that dentists could not manage an efficient dental practice today without a uniform system of codes and list of services (USC&LS). However, it does not go without saying that there also needs to be a uniform system of fees.

Provincial dental associations establish their fee guides based on the results of carefully controlled surveys. The guides are supposed to reflect the cost of doing business within each provincial jurisdiction,

and precise formulae are used to determine a fair and reasonable fee for dental procedures. Unfortunately, this has led to a number of unexpected results. Some dentists failed to realize the intent of fee guides, which is to provide guidance or suggestions. As human nature would have it, they took the easy way out, and adopted the fees listed in the guide as their own, with little or no variation.

Dental associations may also have failed their members somewhat, albeit unwittingly, by providing them with an easy way out. Dentists weren't required to learn the full scope of their business, because one of the most important aspects, setting fees, was given to them on a silver platter.

Alberta dentists have been awakened to that fact. Many Alberta Dental Association members are at a loss, because they have never had to develop the skill or expertise to place a value on their own services or to justify that value to their patients. They have always had the stamp of approval of their association as their standard.

I recently read an article in *Dental Economics* in which the author asks readers: "Are you building relationships or manufacturing units of dentistry?"¹

His point was that unless dentists build their practices by developing a relationship of trust between themselves and their pa-

tients, including an appreciation of the value dentists provide, then patients will ultimately be left with the perception that all dentists are the same. If this occurs, the dentist-patient relationship will lose its impact, and patients will be much less reluctant to switch to a managed care dental plan if it was offered to them.

The fee guide issue really boils down to a very simple question: Should the cost of a three-surface composite in a dental practice at the corner of Portage and Main in Winnipeg, Man., for example, be the same as for a similar three-surface composite in Flin Flon, Man. or in Prince Albert, Sask. for that matter?

The answer depends on a number of factors, does it not? The skill required to render the service shouldn't vary, but the cost to produce the service and the value of that service will surely be different. Do you know what it costs you per hour to keep your dental practice going? Do you know the profit margin in your dental practice for a three-surface composite? Remember, formulae can only factor in values such as overhead costs, responsibility and time. No formula can account for what you as an individual offer your patients, whether it's compassion, quality care, or understanding. Only you and your patients can appreciate the full value of your services.

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I am not advocating the abolition of fee guides across the country, or even suggesting that the Alberta experiment will prove beneficial to the dental profession. However, Alberta's recent actions will undoubtedly give rise to some interesting debates.

The situation in Alberta has also revealed some interesting insights into the way third parties look at value. Alberta Blue Cross has now developed its own fee schedule. Compared to the 1997 Alberta fee guide, the fees Alberta Blue Cross has established for front-end procedures such as examinations, radiographs and cleanings are substantially lower, while the fees for procedures such as extractions have been increased dramatically.

When the average Blue Cross patient with 80 per cent coverage receives treatment in 1998, his or her out of pocket expense for a recall visit will likely be considerably higher than it has been in the past, assuming Alberta's dentists either increase their fees this year

or continue to base them on the 1997 provincial fee guide.

It will be up to individual Alberta dentists to explain the reason for this difference to their patients. The question they need to ask themselves is: Is the value of preventive and diagnostic services reflected strictly in the time, responsibility and overhead costs associated with providing the service, or does value also include the less apparent long-term benefits to the patient, and the equally subtle quality of care provided in their particular office? Alberta dentists have not had to talk about their fees before, but they will have to do so now.

The day of reckoning is coming. Unless dentists learn to stand on their own two feet, and start selling value rather than providing services neatly packaged in codes, they will be more susceptible to alternative schemes of reimbursement from third parties.

Dentists have pampered their patients to the point that both dentist and patient almost automatically equate fees to dental plan

coverage. How often have we heard dentists argue that they can't charge for a certain procedure because there is no code for it? Since when does a dentist have to justify his or her treatment fees based on the existence of a code? Dentists have fallen into a trap by trying to be too accommodating to their patients and their patients' dental plans. Dental plans exist to help patients pay for care, not to be a recipe for treatment.

Would-be professionals tend to gravitate to dentistry because it offers them a chance to be on the cutting edge of an independent and free-thinking lifestyle. However, a great many dentists seem to lose sight of that goal after they graduate. ■

Dr. Luc Dugal is a member of CDA's steering committee on dental benefits issues.

Reference

1. Tarontola, G.J. Are you building relationships or manufacturing units of dentistry. *Dent Econ* 87: 12-14.

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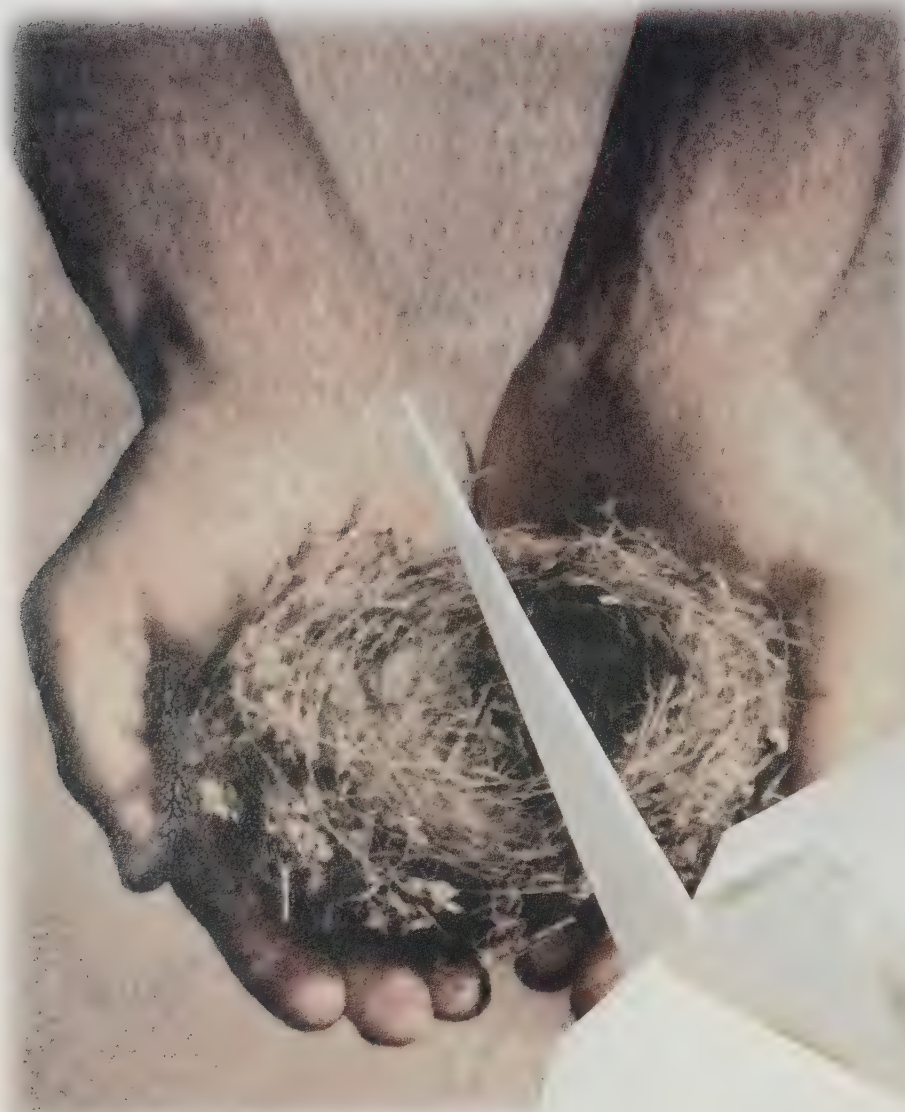
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